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Damage to Sandstone Cores By Particles From Drilling Fluids

By
R. F. Krueger* and L. C. Vogel*

Abstract

A large number of 1-in. diameter by 12-in. long, water insensitive Berea sandstone cores have been exposed to the effects of several typical field drilling fluids under dynamic-high pressure-high temperature conditions simulating those existing in the drilling of deep wells. Data from these tests showed that particles from all of these drilling fluids penetrated into the interstices of the sandstone and produced a permanent impairment of permeability which increased in magnitude directly with the exposure time. Average reductions in permeability to oil of 30 per cent to 60 per cent were found after five days of such treatment with the different drilling fluids. The relative degree of impairment of permeability with time was found to depend upon the type of drilling fluid and the test conditions. However, a correlation of impairment with cumulative filtrate loss has indicated that within the experimental accuracy all the drilling fluids investigated produced an equivalent amount of damage in a core for a given fluid loss. Particle damage from 2-in. to 12-in. or more deep was indicated qualitatively, depending upon the type of drilling fluid used.

The latter portion of the paper is devoted to an attempt to interpret the laboratory results for field application. Calculations indicate that in a radial formation, the reduction in productivity by particle damage alone is approximately the same for each of the drilling fluids tested. After five days exposure to drilling conditions, it appears that the productivity of a formation would be reduced about 10 per cent and after 30 days about 30 per cent. whereas this impairment is shown to be less severe than that often found from fresh water filtrate in a water sensitive formation, the damage for long exposure times of 20 to 30 days is believed to be significant. It is suggested that for long exposure times completion of a well with oil base drilling fluid, even in a nonwater sensitive formation, could result in a productivity approximately 20 per cent greater than that for a completion with clay-water base mud or emulsion mud, provided the hole is rapidly underreamed.

Introduction

It is generally recognized in the industry that fresh water and filtrate from fresh water base drilling fluids markedly reduce the specific permeabilities of sands containing water sensitive clays[1,2] but that significant, although often reduced, effective permeability to oil can be regained by the flow of oil at moderate to high pressure gradients[2,3,4]. Recognition of these facts has resulted in the development of water base drilling fluids whose filtrates are compatible with the formation water in particular zones and oil base drilling fluids whose filtrates do not affect clays[5,6,7,8,9]. Although the invasion of particles from drilling fluids into sandstone has been suggested from laboratory studies[10,11], not until recently was it shown that under dynamic mud flow conditions these particles could penetrate through the mud cake and a 1-in. long core[3]. Under certain conditions these particles produce appreciable plugging within the interstices of sandstone cores. Furthermore, data from the field have indicated that in spite of the utilization of specialized drilling fluids, considerable damage results in the formation immediately surrounding the well bore during completion of the well[12]. Recent theoretical considerations of pressure buildup curves also corroborate this in many instances[13]. Although the magnitude of the observed damage referred to above for linear particle intrusion into 1-in. long cores did not indicate appreciable damage in a radial system, an apparent source of the discrepancy lay in the fact that the early tests did not investigate the effect of cumulative plug-

TABLE I.
AVERAGE PROPERTIES OF FIELD DRILLING-FLUIDS USED FOR TESTS

DRILLING FLUID	WEIGHT LB/FT.³	SHEAR SHEAROMETER LB./100 FT.² 0	SHEAR SHEAROMETER LB./100 FT.² 10 MIN	MARSH FUNNEL VISCOSITY SECS. IN 1 QT.	FLUID LOSS (API) 30 MIN. ROOM TEMP. 25 SQ. IN.	FLUID LOSS (API) 30 MIN. ROOM TEMP. 1 HR.	FLUID LOSS (API) 30 MIN. 200° 25 SQ. IN.	FLUID LOSS (API) 30 MIN. 200° 1 HR.	TIME IN USE IN DRILLING WELL DAYS
EMULSION	68	0	12	45	0.9	3.2	5	9.5	27+
OIL-BASE SAMPLE 1.	85	0	0	60	0	0	0	0	4 1/2
SAMPLE 2.	83	0	0	54	0	0	0	0	11
CLAY-WATER SAMPLE 1.	73	0	10	50	5	11	9	20	2 1/2
SAMPLE 2.	74	0	TRACE	45	3.2	7.8	6	14	27

ging by the particles over a period of time approaching that encountered in the drilling of the oil zone. Thus, the studies reported herein have been devoted primarily to the investigation of permeability damage resulting in an inert core subjected to simulated drilling under dynamic-high pressure-high temperature conditions for varying lengths of time. In general, the test conditions were designed to isolate the effect of particle plugging from other factors such as water sensitivity and water blocking which themselves can reduce the effective permeability. During the backflow tests, a relatively high drawdown pressure of 600 psi per foot of core was used. These conditions are similar to those to be expected during cleanup of a high pressure formation and should be very favorable for removal of any water block or particle plug.

Apparatus and Experimental Procedure

Mud Flow System—The apparatus and flow system shown in Figure 1 are essentially the same as described by Nowak and Krueger[3]. In general, the system consists of a means of circulating a drilling fluid parallel to the faces of sandstone cores mounted in a test cell. In the present tests the drilling fluid was maintained at a uniform temperature of 170° F. in a reservoir containing an agitator and suitable thermostatic controls. Circulation of the drilling fluid through a choke consisting of a 4-ft. length of 3/16-in. ID tubing served to maintain an average pressure drop of 1000 psi across the core specimens. Characteristic operation of the steam driven slush pump resulted in pressure surges of ± 200 psi in all runs. Circulating velocity of the drilling fluid past the core faces averaged from 100 to 130-ft. per min.

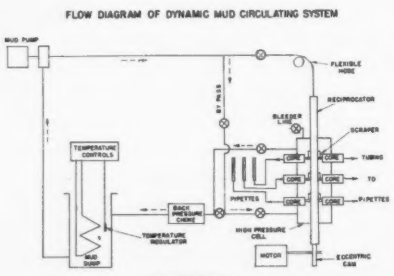


FIGURE 1

The test cell was a 26-in. length of thick walled 4½-in. OD Shelby tubing containing six ports for mounting test specimens. A bar containing six removable, spring loaded scrapers could be reciprocated at a rate of 10 strokes per min. to provide continuous removal of the mud cake from the core faces when desired. The mounted sandstone cores were clamped in the ports against the scraper. All pressure closures were made with "O" ring seals. Figure 2 shows a cross-sectional view of the mounted core specimens and the scraper alignment.

Cores—The test specimens consisted of Berea sandstone cores 1-in. in diameter and 12-in. long, cut parallel to the bedding plane. This type of sandstone was chosen for these tests because of the absence of water sensitive clays in the matrix. All cores were extracted with hydrochloric acid to remove traces of iron. After flushing the cores with distilled water to remove the residual acid, the magnitude of the effective oil permeability has been found generally to be independent of the type of filtrate or water invading the core. Thus, it was possible to eliminate the effect of the invading filtrate from a drilling fluid and determine the effect of mud particles alone on the effective permeability to oil of these cores. Each cleaned core was dried and mounted inside a bronze bushing with an epoxy casting resin, after which its permeability to air was determined. For these samples, this ranged from 400 to 600 md. The mounted cores were then evacuated, saturated with 3 per cent salt solution, and desaturated with oil (42° API filtered kerosene) by the static capillary desaturation method. Following this, an attempt was made to desaturate the cores further by flowing oil at a pressure drop of 1200 psi across the core. When no additional water was removed and the flow rate remained constant, the core was assumed to be in the restored state. Inasmuch as this dynamic desaturation pressure was greater than any pressure used during exposure to drilling fluid or backflow, it was reasoned that desaturation effects would not influence the experimental results. Just prior to installation in the mud circulating system, a final determination of permeability to oil was made at a pressure drop of 600 psi across the core. For the samples used the effective permeability to oil ranged from about 350 to 550 md.

Drilling Fluids—For these tests, three types of drilling fluids were used for comparative purposes. Five sets of tests involving approximately 150 cores were made, two with typical clay-water base muds, two with oil base muds, and one with an emulsion mud. Samples of the same type of mud representing dissimilar drilling histories were chosen from wells in different fields. The properties of each of these fluids were determined by standard API test methods and are listed in Table 1. These properties were maintained during the course of each test by the addition of conventional chemicals when necessary.

Test Procedure—The general test procedure was to mount six cores in the test cell as the drilling fluid was being circulated through the bypass line and being heated up to temperature. Burettes were attached to the outflow ends of the cores (Figures 1 and 2), and the initial readings were taken. After introducing the drilling fluid to the test cell, fluid loss measurements were made at 1, 5, 15, 30 and 60 minutes and at 2-hour intervals thereafter. Tests were run for periods of time ranging from one hour to 100 hours or more (approximately five days). A typical set of tests for one drilling fluid involved times of one hour, six hours, 24 hours and 100 hours. Two kinds of tests were run. In one, the drilling fluid was merely circulated past the face of the core, and in the other the drill-

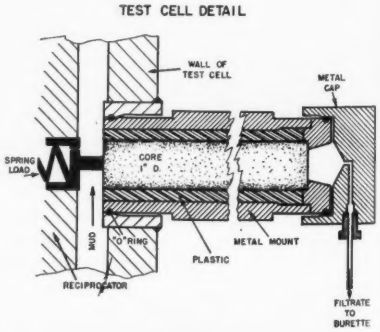
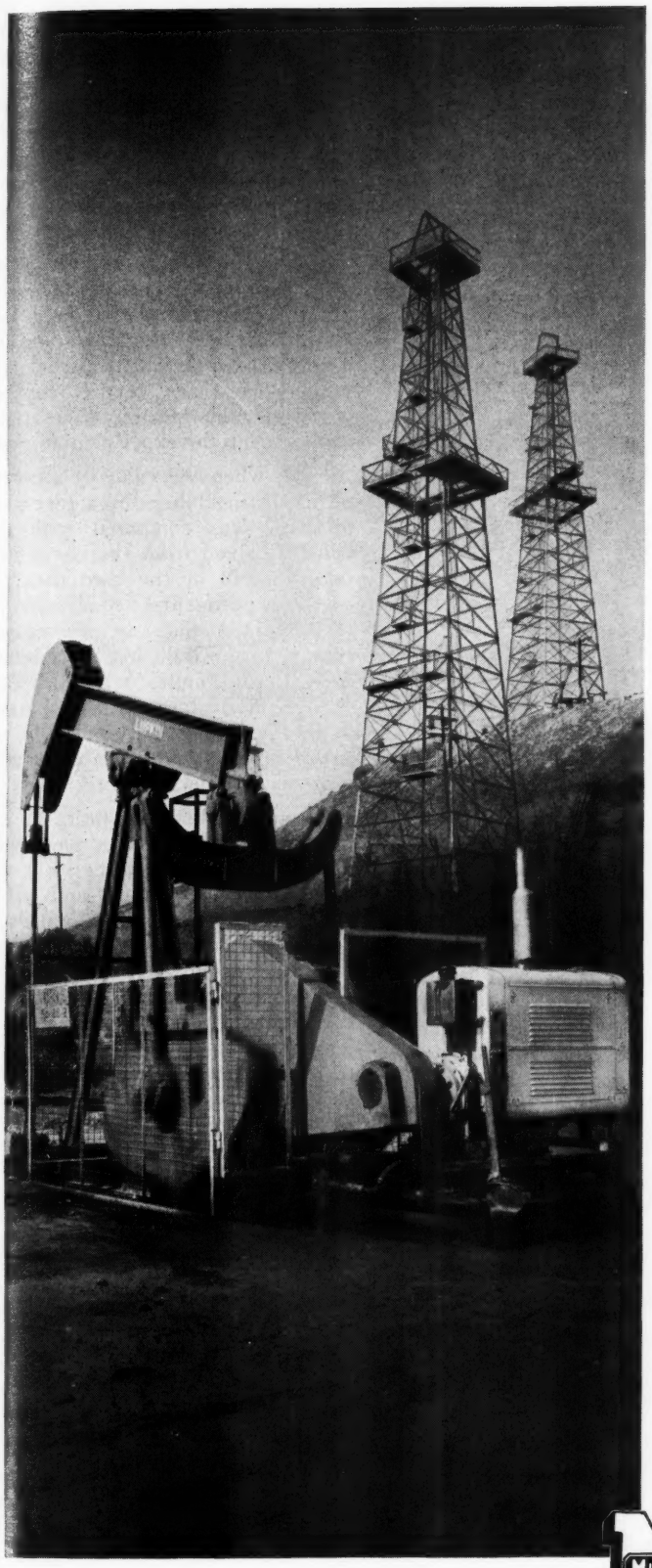


FIGURE 2



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ing fluid was circulated but in addition the mud cake was continually scraped from the face. These two test procedures were believed to be approximately representative of the range of filtration and mud flow conditions present in the well bore with the exception of action below the bit which is undoubtedly the most severe condition encountered but of relatively short duration. In a small number of cases, pressure taps were installed at 2-in. intervals along the core so that initial and final permeability could be compared in these intervals.

At the conclusion of a specified time, three cores were removed from the test cell and reassembled in backflow equipment without disturbing the mud cake. Oil was then backflowed using a pressure drop of 600 psi across the core in a direction counter to that of the filtrate invasion. Permeabilities to oil were determined at intervals during backflow process to establish the permeability recovery curves. The specified pressure drop was maintained throughout the entire backflow sequence until the maximum recovery of permeability to oil was achieved. This procedure eliminated imbibition of the discharged filtrate or the produced emulsion during the cleanup process and resulted in smooth recovery curves. Damage to the cores was determined as the ratio of the maximum permeability to oil after backflow to the original permeability to oil.

Experimental Results — The experimental data showing the effect of exposure time on ultimate per cent recovery of permeability to oil for the three different types of muds are plotted in Figures 3, 4 and 5. Each point represents the average ultimate per cent recovery for a set of three cores which had been subjected to the same experimental conditions. Examination of these figures reveals several similar features.

First, for a given short exposure time, depending on the drilling fluid and test conditions, there is no appreciable reduction of the original permeability to oil. This period of times ranges from 0.1 hour in the case of cores subjected to mud circulation and scraping when using clay-water mud to approximately two hours in the case of cores subjected to mud circulation without scraping when using either oil base or clay-water mud. These results indicate that laboratory tests of long duration are necessary for adequate evaluation of the plugging behavior of a mud under field conditions.

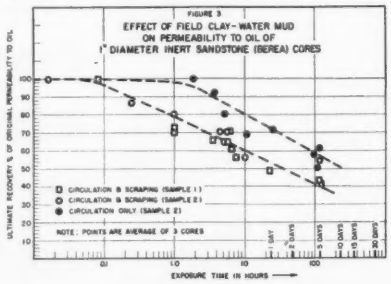


FIGURE 3
EFFECT OF FIELD CLAY-WATER MUD
ON PERMEABILITY TO OIL OF
1" DIAMETER INERT SANDSTONE (BEREA) CORES
ULTIMATE RECOVERY % OF ORIGINAL PERMEABILITY TO OIL
CIRCULATION & SCRAPING (SAMPLE 1)
CIRCULATION & SCRAPING (SAMPLE 2)
CIRCULATION ONLY (SAMPLE 3)
NOTE: POINTS ARE AVERAGE OF 3 CORES
1 DAY
2 DAYS
5 DAYS
10 DAYS
20 DAYS
EXPOSURE TIME IN HOURS

Second, after plugging becomes apparent, there is a trend towards lower ultimate per cent recovery of permeability to oil with increasing exposure time.

Third, the ultimate per cent recovery of permeability after circulation with scraping is approximately 15 to 20 per cent lower than the recovery after exposure for the same length of time with circulation only. After five days of exposure with circulation and scraping, the approximate ultimate per cent recoveries were 40, 45 and 55 per cent for the clay-water, emulsion and oil base muds, respectively. However, in the experiments in which the mud cake was not removed by scraping the ultimate per cent recoveries were approximately 58 and 70 per cent for clay-water and oil base muds, respectively.

Finally, for the cases studied, there is no apparent difference in the effect of samples of a similar type of drilling fluid upon return permeability even though, as was seen in Table 1, these muds were chosen from entirely different drilling environments.

Figure 6 shows typical fluid loss data for the different types of drilling fluids when subjected to the experimental conditions used in this work.

Discussion

Interpretation of Data—An examination of figures 3, 4, 5 and 6, leads to the following: (1) In general, the drilling fluid and/or the experimental conditions which produce the greatest total fluid loss also cause the greatest damage to permeability; and (2) when the total fluid loss curve and the curve for the ultimate recovery of return permeability for the cores subjected to both circulation and scraping with oil base mud are compared with the similar curves for the cores subjected to circulation alone with water base mud, the curves are found to be remarkably similar.

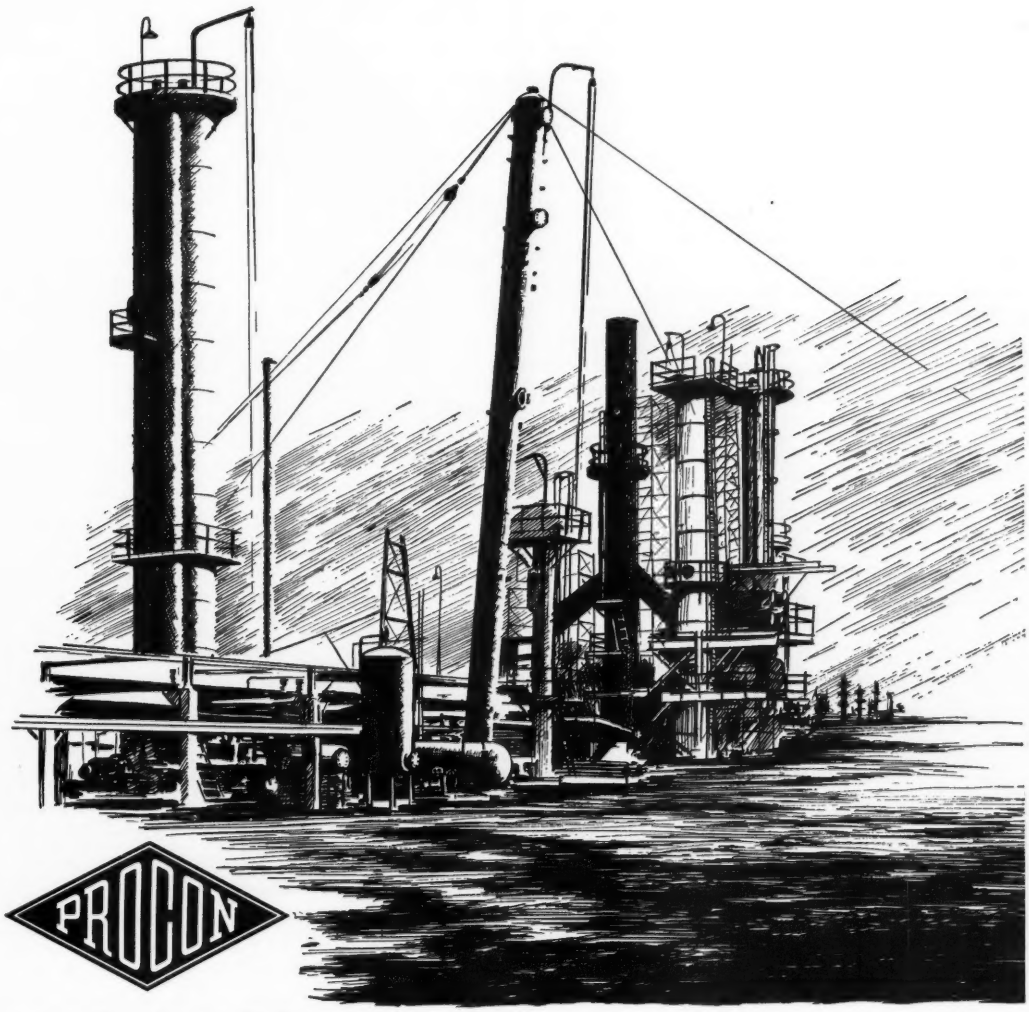
These two observations alone may lead one to suspect a correlation between cumulative fluid loss and the permeability damage resulting from the attendant particle invasion. However, further support is given to this idea by observations made during the experimental work.

First, when the value of ultimate return permeability for a given set of cores was compared with the value obtained from the curve representing all of the core data for given experimental conditions, it was noticed that an abnormal change in the fluid loss to a set of cores (for example, as a result of a change in drilling fluid properties or in the initial spurt) usually resulted in an abnormal value of ultimate return permeability.

Second, within the limits of experimental error, in tests made with cores which were successviely exposed to drilling fluid and backflowed several times, the total damage calculated after each successive test was essentially the same as that observed for a core exposed continuously for the same total length of time. Each of these bits of information apparently supports the hypothesis that particle damage is a cumulative phenomenon and, therefore, possibly a function of the total filtrate throughput.

Accordingly, results from all tests have been accumulated on a single graph (Figure 7) to investigate the possibility of a correlation between cumulative fluid loss and per cent ultimate recovery of permeability. Each point on this graph represents data obtained from a single core rather than those from a set of cores as in previous figures.

There are several features which appear to be noteworthy: First, although a rather wide statistical spread in the data is present, a significant overall trend is apparent; second, for a given drilling fluid the trend of this array of data is apparently not dependent upon the ex-



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perimental conditions, such as scraping or not scraping or changes in drilling fluid properties, but falls randomly about an average line; and, third, the trend of the data is apparently independent of the type of drilling fluid.

These results imply that under the simulated well conditions existing in these experiments, the advantage to the use of an oil base drilling fluid apparently lies in its inherently lower fluid loss to the formation. In other words, for a given total fluid loss, particle plugging of sandstone seems to be approximately the same for the oil base drilling fluid and the water base drilling fluid, provided the rock is not chemically affected by the filtrate and the formation pressure is sufficient to eliminate the possibility of fluid blocking. This is a rather surprising result in view of the obvious differences in mud cake permeability and other properties of these different types of drilling fluids. It is interesting to note that one feature common to all the drilling fluids tested has been their use in actual operations.

Application of Results to a Radial System—The attempt to apply laboratory data to field usage is often difficult. While such factors as inability to duplicate field conditions exactly, small size of core sample, permeability variations, and the like, contribute to the difficulty in solving this problem, one of the most frequent omissions is the failure to translate the results obtained with linear core systems in the laboratory in such a manner as to delineate the behavior to be expected of a radial system. An attempt has been made below to make a rough appraisal of the significance of the results presented above when applied to a radial system.

In Figure 8 there has been plotted a family of curves which shows how the productivity of an oil producing formation will be affected by damage from any source which lowers the effective permeability to oil for the formation immediately adjacent to the well bore. An ideal radial system is assumed with uniform permeability throughout the reservoir except for a permeability discontinuity representing the damaged zone surrounding the well[14]. As can be seen from these curves, the radial depth of penetration and the permeability reduction of the damaged zone are quite critical in determining the overall reduction in productivity. Therefore, an effort was made to determine the depth of penetration of the damaged zone in a portion of cores which had been subjected to simulated drilling for five days. Three separate methods were investigated for this purpose: (1) sections of the damaged end of the core were successively broken off and a permeability determination made after each operation; (2) pressure readings were made at 2-in. intervals along the core before and after exposure to mud, followed by a calculation of the damage in each section from the change in pressure distribution; and (3) pressure readings were taken at 2-in. intervals along the core during exposure to mud to observe the manner in which the plugging occurred in the core.

Results from such tests indicate qualitatively that the major portion of the particle damage from the oil base drilling fluid after five days of exposure to mud extended about 2 in. into the core, whereas damage from both the water base and emulsion drilling fluids appeared to extend about 6 to 12 in. into the core after a test of the same duration. In the case of a core damaged with clay-water base mud, particles were still present in the filtrate and thus there still exists the possibility that these particles may cause plugging beyond the 1-ft. length of core used in these tests.

In order to discuss the application of the laboratory results presented herein to a radial system, both the approximate depth of penetration of the particle damage and also the ultimate recovery of permeability to oil are needed. It should be noted here that thus far we have based the depth of penetration of the mud particles upon information deduced from experiments with linear cores. In addition, we have shown that the degree of plugging has been a function of the cumulative fluid loss. It is obvious that in a radial system the plugging particles will not be carried to as great a depth as in a linear system for a given value of cumulative fluid loss per unit area. Thus, in practice, depth of penetration of the damage and loss of productivity may be slightly less than indicated because of the increase in filter surface area with distance radially and the increase in volume of pore space per unit quantity of particles in the filtrate. To take the most severe case, let us assume that approximately the same volume of sandstone will be damaged in both the linear and the radial cases for a given volume of filtrate per square inch of sandstone surface, the estimated depth of penetration of particle damage from a 7-in, well bore into a radial formation becomes approximately 1.6 in. for the oil base drilling fluid and approximately 5 in. for the clay-water and emulsion drilling fluids. To estimate the degree of damage, consider the results shown in Figures 3 and 4.

Inasmuch as the ultimate recovery of permeability to oil differs by only 10 to 20 per cent for the two conditions of circulating and circulating plus scraping, an average value should give a fairly reasonable estimate of the damage which might result from part-time circulation without scraping and part-time removal of the mud cake. Thus, for the foot-long cores, the average ultimate recovery of permeability after exposure to mud for five days was about 48 per cent for the clay-water base and emulsion drilling fluids and 63 per cent for the oil base drilling fluid.

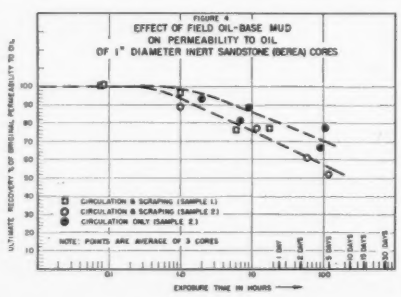
FIGURE 4
EFFECT OF FIELD OIL-BASE MUD
ON PERMEABILITY TO OIL
OF 1" DIAMETER INERT SANDSTONE (BEREA) CORES
ULTIMATE RECOVERY % OF ORIGINAL PERMEABILITY TO OIL
CIRCULATION & SCRAPING (SAMPLE 1)
CIRCULATION & SCRAPING (SAMPLE 2)
CIRCULATION ONLY (SAMPLE 2)
NOTE: POINTS ARE AVERAGE OF 3 CORES
EXPOSURE TIME IN HOURS

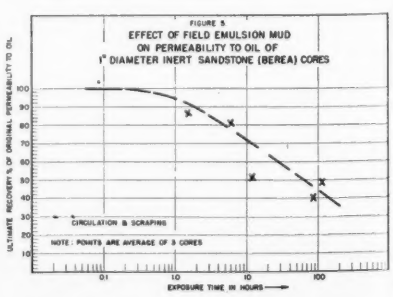
FIGURE 5
EFFECT OF FIELD EMULSION MUD
ON PERMEABILITY TO OIL OF
1" DIAMETER INERT SANDSTONE (BEREA) CORES
ULTIMATE RECOVERY % OF ORIGINAL PERMEABILITY TO OIL
CIRCULATION & SCRAPING
NOTE: POINTS ARE AVERAGE OF 3 CORES
EXPOSURE TIME IN HOURS

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Electric Resistance and Fusion Weld—Plain End	14" to 18" O.D.	Up to 40'	.250" to .500"	Napa, Calif.—Basalt-Kaiser
Electric Resistance Weld—Plain End	5⅝" to 12¾" O.D.	Up to 55'	.188" to .375"	Fontana, Calif.
Electric Fusion Weld—Expanded—Plain End	20" to 30" O.D.	Up to 40'	.250" to .500"	Napa, Calif.—Basalt-Kaiser

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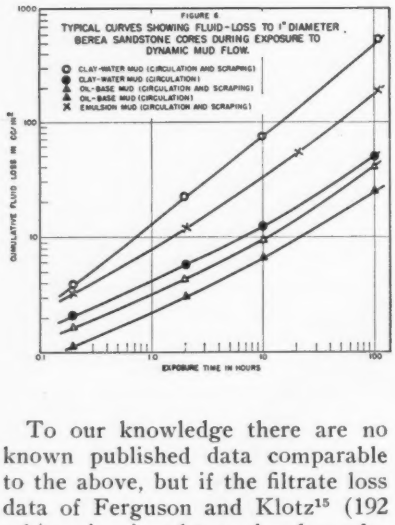
FIGURE 6
TYPICAL CURVES SHOWING FLUID-LOSS TO 1" DIAMETER BEREA SANDSTONE CORES DURING EXPOSURE TO DYNAMIC MUD FLOW.
CLAY-WATER MUD (CIRCULATION AND SCRAPING)
CLAY-WATER MUD (CIRCULATION)
OIL-BASE MUD (CIRCULATION AND SCRAPING)
OIL-BASE MUD (CIRCULATION)
EMULSION MUD (CIRCULATION AND SCRAPING)
CUMULATIVE FLUID LOSS IN CC/IN²
EXPOSURE TIME IN HOURS

To our knowledge there are no known published data comparable to the above, but if the filtrate loss data of Ferguson and Klotz[15] (192 ml/sq. in. in about six days for emulsion mud) is applied to Figure 7, a value of 40 per cent may be inferred for the ultimate recovery in a linear foot-long core. This is in reasonable agreement with our value of 48 per cent, considering the differences in their model well system and our linear core system, and indicates that the experimental conditions of circulation and circulation plus scraping as used for the present report yield filtrate losses comparable (although not identical) to their drilling conditions.

Because almost the entire core length is considered to be damaged by the clay-water base and emulsion drilling fluids, the value of 48 per cent for the return permeability will be used in the ensuing discussion. In the case of the core damaged with oil base drilling fluid, however, the permeability of the 2-in. damaged length only is about 22 per cent of its original value.

To summarize the preceding discussion, it has been deduced from the laboratory data that drilling a 7-in. diameter well bore in a sandstone formation during a five-day period may result in a 78 per cent reduction in permeability to oil for a 1.6-in. invasion of particles when using oil base drilling fluid and a 52 per cent reduction in permeability to a distance of about 6 in. when using clay-water base or emulsion drilling fluid. If these values are applied to Figure 8, it is found that the productivity is reduced to about 85 to 90 per cent of the original value when any of the three types of drilling fluid is used. It appears from these results that particle invasion into a radial formation over a five-day completion period would produce approximately a 10 to 15 per cent reduction in productivity.

While a five-day completion period would probably be adequate in many fields, 30-day completions are not uncommon in some fields in California, for example, in the Torrey field. It seems possible to extrapolate the data of Figures 3, 4 and 5 to cover such a completion period. In this case the permeability recovery factor would be 0.35 for the clay-water base and emulsion drilling fluids and 0.50 for the oil base drilling fluid. Between the five-day and 30-day completions, the cumulative fluid loss would approximately quadruple (estimated from Figures 6 and 7). While there is no precise way of estimating the depth of penetration of the particles in this time, it appears reasonable to expect that it would no more than double. Appreciable errors in the assumed penetration at this point will not seriously affect the results. Consequently, if the depth of penetration is assumed as 3.2 in. for a completion with the oil base drilling fluid and 12 in. with the water base or emulsion drilling fluid, and if the effective permeability recovery factors are assumed as 0.21 and 0.35, respectively, the productivity of a radial formation would be approximately 70 to 75 per cent of the original value after completion with any of the three types of drilling fluid tested.

In general, it may be seen from the above discussion that the laboratory data tend to give more pessimistic values for particle damage than should be expected in the field. Thus, under the conditions we have imposed in this experimental work, it appears that particle damage for short completion times up to five days is not large (on the order of 15 per cent reduction in productivity), but for the long completion times, 20 to 30 days, the reduction in productivity could become more serious (on the order of 30 per cent). It should be pointed out again, however, that the experimental conditions upon which these conclusions have been based are very favorable to maximum cleanup in the formation, especially in the cases of shallow penetrations. Further experiments at lower back-flow pressures may indicate more severe damage than has been shown in the experiments reported herein.

Although the reduction in productivity in a radial formation has been deduced to be approximately the same for particle damage by all three types of drilling fluid investigated, the data presented suggest a possible advantage to the use of the oil base drilling fluid even in a non-water sensitive formation. Because of the small depth of penetration of particle damage during exposure to the oil base drilling fluid, it seems possible that for long completion times (20 to 30 days) the use of a rapid underreaming technique to remove about 3 to 4 in. of the damaged formation around the well bore may result in decreasing the reduction in productivity from about 30 per cent to 10 per cent or less. In this case, the oil base completion could result in a 20 per cent greater productivity than a comparable clay-water base completion. On the other hand, there would seem to be no great advantage to using the more expensive oil base drilling fluid to complete a well in a non-water sensitive formation when the completion time is less than five days.

Comparison of Particle Damage with Filtrate Damage—The laboratory data accumulated by Nowak and Krueger[3] for the per cent recovery of permeability to oil for water sensitive cores invaded with various particle free water base field mud filtrates show about the same range of values (30 to 60 per cent) as the data presented in this paper for the recovery of permeability to oil for water insensitive cores exposed to typical field muds for five days. On the other hand, the recovery of permeability for a water

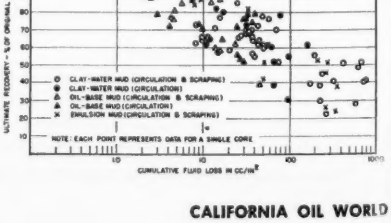
FIGURE 7.
EFFECT OF CUMULATIVE FLUID LOSS ON ULTIMATE RECOVERY OF PERMEABILITY TO OIL FOR 1" DIAMETER INERT SANDSTONE (BEREA) CORES
CLAY-WATER MUD (CIRCULATION & SCRAPING)
CLAY-WATER MUD (CIRCULATION)
OIL-BASE MUD (CIRCULATION & SCRAPING)
OIL-BASE MUD (CIRCULATION)
EMULSION MUD (CIRCULATION & SCRAPING)
NOTE: EACH POINT REPRESENTS DATA FOR A SINGLE CORE
CUMULATIVE FLUID LOSS IN CC/IN²

sensitive core invaded with filtered oil base filtrate was shown to be about 100 per cent, compared to our values of 60 to 70 per cent for an inert core exposed to the drilling fluid itself for five days. Thus, on the basis of laboratory data alone, it appears that particle invasion into an inert sandstone core can be about as damaging as fresh water filtrate invasion into a water sensitive sandstone. However, because the filtrate will penetrate farther than the mud particles in a radial system, one would expect water damage in many water sensitive zones to be more serious than particle plugging. Assuming a cumulative filtrate loss of 150 cc/sq. in. in five days, a porosity of 25 per cent and a well bore diameter of 7 in., the depth of penetration of the filtrate and, therefore, of the damage in a radial system will be about 16 in. Calculations indicate that the reduction in productivity for this case will be 5 to 30 per cent greater than for particle plugging after five days exposure to drilling fluid. For example, the damaged productivity may range from 65 to 80 per cent of the original productivity, depending upon the type of filtrate.

For a 30-day cumulative filtrate loss of 600 cc/sq. in., the depth of penetration of the filtrate damage would be about 32 in. The productivity in this case would be about 55 to 75 per cent of the original value. Filtrate damage (as distinct from particle damage) from an oil base drilling fluid in a water sensitive zone has been found to be essentially nil in either case.

It is apparent that damage to a water sensitive formation by fresh water or filtrates from fresh water drilling fluids can be greater than particle damage in a formation which is inert to water. Particle damage can become a serious factor, however, for long completion times. Because both particle damage and filtrate damage are inferred to be a function of total filtrate loss to the formation, it seems likely that in a water sensitive formation the two would be additive.

From the data and discussion presented, it appears that there are several completion techniques which could be used during well completion to increase the productive effectiveness, namely: (1) select a completion method which will provide a minimum time of exposure of the formation to the drilling operation; (2) use a completion fluid which has the minimum practical filtrate loss; and (3) use a completion fluid whose filtrate is compatible with the formation.

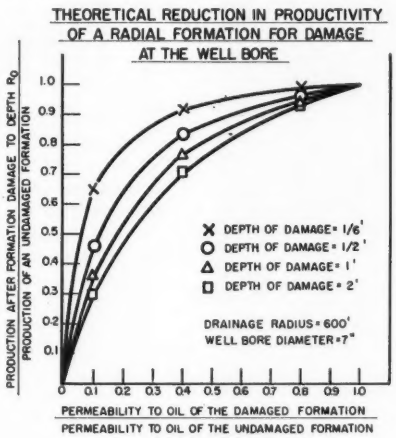

FIGURE 8

It is interesting to note that on the basis of field experience most operators have already adopted the use of these techniques as optimum completion procedure.

Conclusions

Laboratory tests with Berea sandstone cores exposed to field drilling fluids under dynamic-high temperature-high pressure conditions have resulted in the following conclusions in regard to particle damage:

1. Particles from the drilling fluids tested passed into the cores and caused a permanent reduction in permeabiilty.

2. The permeability damage of a core so treated increased with time of exposure to the drilling fluid.

3. Different types of drilling fluid caused different degrees of damage in a core for a given exposure time, but different samples of the same type produced about the same damage even though from dissimilar drilling environments.

4. In agreement with previous work, cores subjected to circulating mud alone were damaged less than cores which had the mud continually scraped from the core face during circulation.

5. When data from all cores were plotted on a single graph of ultimate recovery permeabiilty vs. fluid loss, it was found that the degree of damage was independent of the type of drilling fluid and test conditions, and was related only to the total amount of filtrate (and the attendant particles) which had passed into the core.

6. Qualitative data indicated that particle damage extended about 2 in. into a core exposed to the oil base drilling fluid for five days and about 6 to 12 in. or more into a core exposed to clay-water base and emulsion drilling fluids for the same length of time.

A theoretical consideration of the significance of these results in a radial system resulted in the following tentative conclusions:

1. The laboratory data tend to yield results in regard to the degree of damage slightly more pessimistic than should be expected in the field.

2. For sandstone for which water sensitivity and water blocking are not important factors, all five drilling fluids tested appear to cause approximately the same reduction in productivity. For a five-day exposure to circulation and scraping conditions, the reduction in productivity was calculated to be approximately 15 per cent and for a 30-day exposure approximately 30 per cent.

3. It would appear that damage from fresh water filtrates in water sensitive fomations is in many cases more severe than particle damage in an inert formation, but the latter does seem to be significant when completion times extend from 20 to 30 days or more.

4. For long mud exposure times, it appears to be advantageous because of the apparent small depth of penetration of the particle damage to complete a well with oil base drilling fluid, even in non-water sensitive zones. Calculations indicate that it may be possible to underream the bore hole sufficiently and rapidly enough to achieve a productivity approximately 20 per cent greater than that for a water base or emulsion drilling fluid completion.

Acknowledgment

The authors wish to thank the many members of the Research and Process Department of Union Oil Company of California, whose combined efforts aided in obtaining these results. We are particularly

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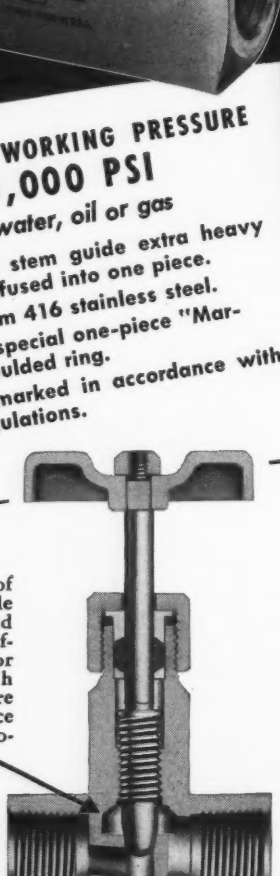

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Appreciation is also extended to Union Oil Company of California for permission to publish this paper.

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*Research and Process Department, Union Oil Company of California, Brea, California.

(Presented at the Spring Meeting of the Pacific Coast District, Division of Production, American Petroleum Institute.)

Shell Expands Ventura Plant

Shell Oil Company recently announced the completion of a $2,800,000 expansion program at its natural gasoline plant at Ventura, Calif.

Incorporation of new and enlarged facilities for extracting heavy hydrocarbons such as natural gasoline, propane, butane, etc., from natural gas ups the plant's normal throughput of "wet" natural gas from 90 million cubic feet per day to approximately 133 million cf/d.

The project, started in March 1953, was undertaken to meet increasing demands for natural gasoline and liquefied petroleum gases in Southern California and to fill the needs of Shell Chemical Corporation's new Ventura plant for the manufacture of anhydrous ammonia from natural gas, steam and air.

As well as increasing the plant's throughput of gas, the expansion has increased its production of natural gasoline used in the manufacture of automotive gasoline from 155,000 to 280,000 gallons per day. LPG production, now rated at 60,000 gallons per day, has been doubled.

Contractors for the project were Fluor Corporation, Ltd. and Guy T. Martin and Co., Inc.

Included in the project were a $250,000 wet gas gathering system, storage facilities for 250,000 gallons of natural gasoline and new tank truck and rail car loading racks. The plant is designed for the easy incorporation of added facilities to up its gas throughput to 165 million cf/d should the need arise in the future.

California Natural Gasoline Association Have San Francisco Bay Area Chapter

On April 29th the newly formed San Francisco Bay Area Chapter of the California Natural Gasoline Association held its first meeting. The parent organization was organized in 1925 at Long Beach, California. The purpose was to foster the solution, by common effort, of problems in the then infant natural gasoline industry. The Association now has over 1,000 members and has broadened the scope of its technical work to cover all phases of problems connected with the handling and processing of light hydrocarbons. This brings together men in the Natural Gasoline, Refining, Natural Gas Production and Distribution, Liquefied Petroleum Gas and Petrochemical Industries.

The San Francisco Bay Area Chapter, now boasting about 150 members, has been organized by a fifteen men Steering Committee. Warren H. Kraft, Vice President of Honolulu Oil Corporation is serving as temporary chairman. Floyd Huff, Standard Oil Company of California, is in charge of the membership drive and Donald Smith of Tide Water Associated Oil Company is in charge of arranging programs.

The first meeting was held on April 29th in the Crystal Room of the Bellevue Hotel. The meeting served as an introduction, in the Bay Area, of the type of program which has long made California Natural Gasoline Association a popular association. Four speakers of national prominence gave short talks on modern trends and innovations in the various industries in which the light hydrocarbons play a prominent part.

In addition to the San Francisco Bay Area Chapter, the parent organization of CNGA carries on monthly meetings in Los Angeles, the Taft Chapter in the Taft-Bakersfield area, and the Coastal Chapter serves the area surrounding Ventura.

The California Natural Gasoline Association has established a number of testing standards for natural gas, natural gasoline and L.P.G. which have world wide use. The technical publications of the organization have also received world-wide notice and have been largely responsible for the rapid development of the industries the Association serves.

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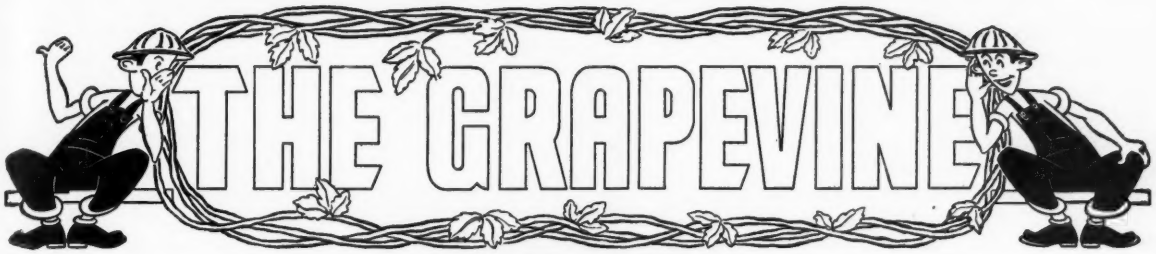

By RICHARD SNEDDON

Tepee Meteorology

In closed session with a group of higher-ups a few days ago, A. C. "Cy" Rubel told a cute story about an Indian up in Canada who made a practice of wandering into a construction camp every day and amazing the boys with his always accurate predictions of forthcoming weather conditions. He would announce solemnly that it was going to snow in the afternoon, and sure enough it would snow. When he proclaimed that the sun was coming out in the next few hours, the sun came out. One day he came to camp as usual, but he didn't have a word to say. Even when he was pressed to do a little more prognosticating he simply shook his head and refused to utter a word. Finally, a lad who couldn't quite understand this sudden change of attitude asked him what was the cause of his silence. "Why," he said, "your predictions have been right on every occasion. Can't you give us one today?" The Indian remained adamant. "No can do," he said. "What's the matter?" asked the curious one, and the redman answered, "Radio broke!" Cy also told of another brave who prophesied a long, hard winter because "white man lay'm in plenty firewood."

Financial Disaster

Had a lovely time at the Nineteener's pari-mutuel deal down at Rancho Santa Fe the other week end, excepting that Paul Whiteley, the purchasing agent for the Flying Horsemen, and Hal Davis, the equipment distributor and former Big Shot, dealt very unkindly with Bill Cline and ourself in a gin rummy contest. The result of this fracas should have driven us into a complete gin rummy eclipse, but being one of the less impressionable type, we tried it again a few days later and in a lunchtime session received another nasty trouncing from Don Grubbs, the Oilwell Supply Company chap. Scarcely had we recovered from that blow when we ran afoul of George Trembley in a third joust, and this one really completed our ruination. We shall gladly sell, at our below cost, our extensive library of gin rummy literature.

We Visit Jack Daniels

Getting back to the Nineteener's whingding, upon our arrival at the La Jollan on the opening night of the festivities, we visited briefly with the top members of the Jack Daniel's Syndicate, to wit Henry Paulsen, the Bankline veep, and his principal cohort, Roy Johnson, the nited Harvard graduate and bebop virtuoso. This little session was slightly marred by a gas leak, and we were obliged to open the doors to escape asphyxiation, but there were compensations. At least we were warm internally!

The Meeting is Called to Order

The first night was the occasion of the annual banquet, but someone else will have to report what happened there. All we can dimly remember is that Bill Farrar wore a pair of cheese crackers behind his glasses and told another scad of shorties that were up to his usual standard. Doc Hayes, the erudite drilling chap, and Dale Russell, the oilman's Will Rogers, arrived after closing time and demanded that the meeting begin forthwith. The meeting had only been over for an hour. Len Price, the current Big Shot and our roommate on this occasion, banged his gavel with a rare show of authority, but the results were not at all promising. The heel of the evening was devoted to a scramble for pari-mutuel tickets which were marketed by Joe Aderhold, the originator of the pari-mutuel idea, Jim MacDonald who has also originated a few ideas, and Lev Sacre, the imperturbable secretary of this strange assortment.

Golfers Tee Off

Next morning we jumped briskly out of bed and shaved for 45 minutes with an electric razor from which we had neglected to remove the plastic protector that covers the blades. Then we dashed downstairs just in time to catch Jack Perrin dashing upstairs to get his sun glasses. When we pointed out that he had them on, he was only slightly surprised. Out on the starting tee the usual assortment of wisecracks were hurled at the contestants by Ward Blodget, Dale Russell, and other temporary idlers, the best of the morning being Dale's remark that Henry Paulsen (a southpaw) didn't have much chance because he stood on the wrong side of the ball.

Leaders Hit By Tidal Wave

The big catastrophe of the first day was the failure of Dick Whelan and his partner, Ken Kreiger, to sustain the pace. They were well in front of the field when they arrived at the water hazard on the 14th hole. Here they left so many balls in the pond that the water rose four inches. Out of regard for the members of their respective families, their scores on this hole are not being made public, but they would make lovely numbers for freight cars. In the meantime, Charlie Schriber and Bill Cline galloped off with low net for the day, while Jim MacDonald and Fox Boswell, Allen Dragge and George Trembley, and Roger Brown and Wendell

Jones all tied for second place. Saturday evening we spent in the La Jollan dining room with sundry other members and once were flatteringly mistaken for a waiter by Fred Currie. However, Fred apologized to the real waiters for his blunder and thereby narrowly averted an international incident.

Meet The Winners

We had to leave before the second day's play was completed, but we are right proud to announce that we picked the winners, Bill Conroy and Roger Brown, and are quite hopeful as a result that we will overcome the shock of the gin rummy debacle already mentioned. The runners-up in the fracas were Hal Davis and Art Donnelly, and Phil Hauck and Dale Russell. Roger Brown, by the way, was top dog in the two-day play, and we want to thank him and Bill Conroy for carrying our mazuma on their noses so successfully. The pari-mutuel was a welcome change from the usual calcutta and will probably be instituted as an annual and may be even as a semi-annual event.

"We Go Visiting"

This heterogeneous mess of inconsequentials is being written at the beginning of what is a cinch to be a hectic week. Only this morning, Monday, we sashayed down to the Halliburton office with Larry Miller for a bit of chatter with Harold Doane, assistant division manager, and Vernon Young, division engineer, a pair of right personable people from whom we learned all sorts of interesting ways of making well completions more complete and increasing production from stubborn and graspy sands. When the conversation turned to viscosity and Verne began to talk in terms of poises, we pleaded a date and left because, honestly, up to that moment we had always thought "poise" was French for peas. While we were there we knocked on the door of youngish Dave Halliburton, president of HAP Drilling Company, better known to his friends as "Butch," and were greeted by a smiling blonde who told us that he was out for the day. It was too bad, for we had hoped to find out from Butch whether or not there really is such a thing as a poise, and if there is, where we could see one.

PIPE LINE CLUB PREXY

Norman Anderson, manager of pipe lines for Richfield Oil Corporation, is like most big men modest and retiring almost to the point of bashfulness, yet he has had a career about which anyone might easily be forgiven for waxing chesty. Norm was born in Barre, Vermont, but while still very young, migrated with his parents to Los Angeles, California. Here in due course he attended University of Southern California, working during his summer vacations for Richfield, and in the fall making a name for himself as a tackle on the famed Trojan eleven. By a peculiar set of circumstances he kicked off the first game in the present Rose Bowl on January 1, 1923 when USC beat Penn State 14 to 3, and also kicked off the first game played in the Los Angeles Coliseum when the Trojans and Cal Tech played a Coast Conference game in the same year that ended in another win, 18 to 7, for Coach Elmer Henderson.

In 1924 he represented the United States in the Olympic Games at Paris, France, as a shot putter, and indeed has altogether an outstanding record in competitive sports. Upon his graduation from USC with a commerce degree in 1925, he started work for Richfield's so-called RIOC refinery at Hynes on the gang and one year later was transferred to the pipe line department as a gauger. Thence he functioned as a relief dispatcher for a spell, later as division foreman in the San Joaquin Valley, and finally in 1948 he was appointed to his present elevated post, manager of pipe lines.

Norman makes his home on the sands at Hermosa Beach and in his spare moments spends more time on the sands in traps at various golf courses. He confesses that his divot lofting is neither neat nor effective but when he is free to do so he thoroughly enjoys it nonetheless. He can also be induced to do a little angling when the circumstances are right but his first love sportswise is really ditching the fairways with a No. 8 trencher. He is a popular member of the Los Angeles Petroleum Club and was recently elected president of the Western Pipe Liners' Club which is a pretty strong indication of the esteem in which he is held by his fellow pipeliners.

Interviewing a Top Sargent

At noon we had lunch with Bill Sargent, vice president of Sargent Engineering Corporation, and one of the best story tellers in the oil business. Bill is a pretty serious minded individual about his responsibilities, but he has the happy faculty of being able to intersperse his discussion with appropriate bits of humor. That is why he is so much in demand as an after dinner speaker. He is known to and by all the football greats—players and coaches alike—from New York to Los Angeles. He speaks Spanish fluently, and altogether, is one of the most entertaining executives in the equipment field. Incidentally, like ourself, he is one of a family of seven boys and three girls; only in our case they were all born in Scotland, and there were so many burrs in their speech that when we started a kitchen debate everybody thought it was threshing time.

Ladies Stage May Fete

Tomorrow night brings the May Fete at the Petroleum Club with Mrs. S. F. Bowlby and a corps of assisting lovelies in charge of arrangements. This will feature dancing to the music of Barney Sorkin's orchestra, and if we don't suffer a sacroiliac displacement at that affair, things must be knitting together better than we thought. It might be mentioned that these Petroleum Club ladies do a really outstanding job of decorating the Club quarters and setting the correct atmosphere for an evening of dancing and diversion. It really stimulates us perennial stags to all sorts of Astairish antics for which we suffer acutely the next morning.

Hither and Yon

Thursday and Friday came the API spring meeting with all its concomitant of dinners, cocktail parties, speeches, and visits to smoke-filled rooms. Thursday at noon we joined a group of press men who were hosted by Olen Lane, the Continen-

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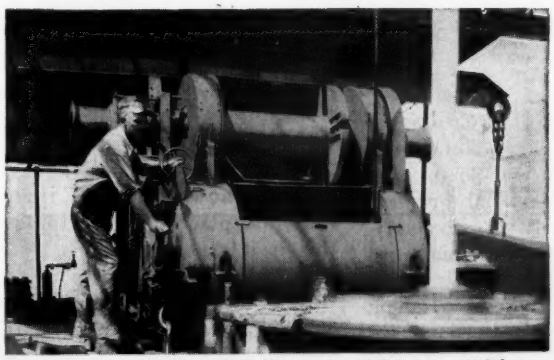

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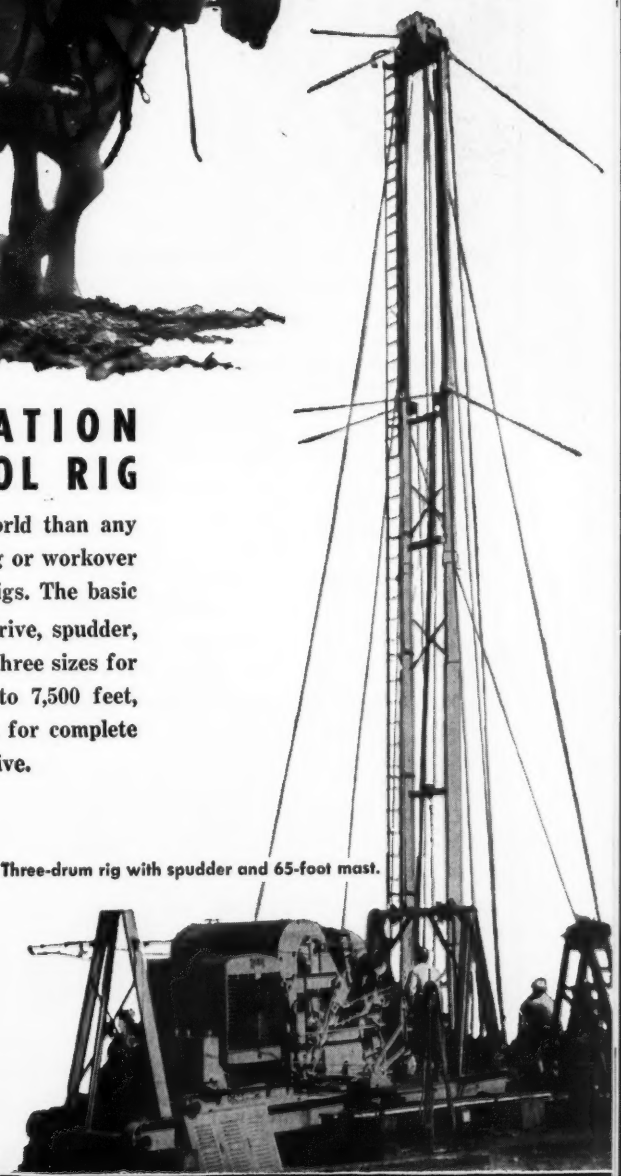

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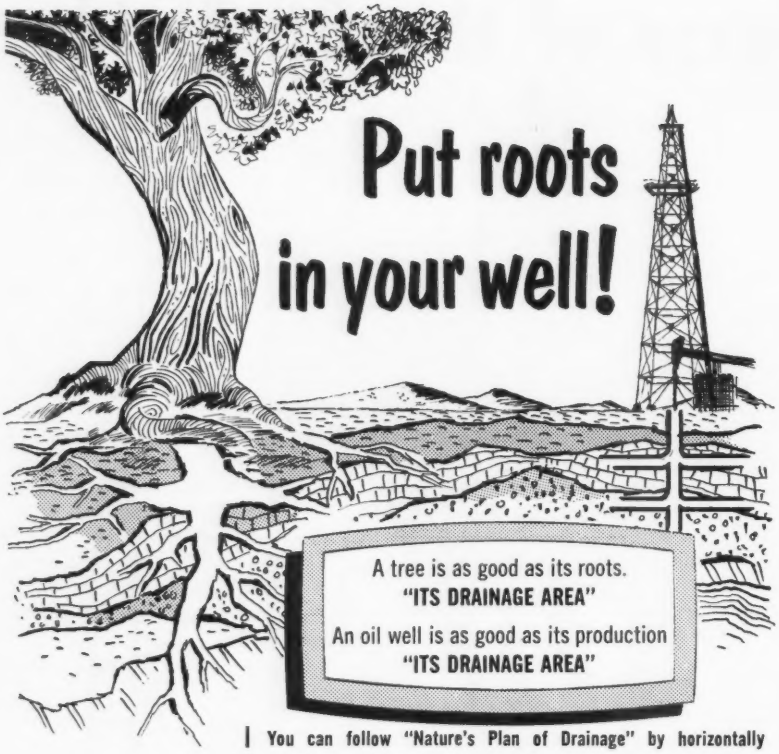
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tal Oil Company's top executive in this division. Friday evening the Desk and Derrick girls had a cocktail party at the Petroleum Club. We weren't invited to that one, but crashed it anyway. And on Saturday we had the PPP barbecue at Brea, honoring Henry Grinnell, Glenn Merkley, and Lou Bronzan, the chaps who first conceived the P.P.P. idea. That was probably productive of more back slapping than a chiropractic treatment, and the air was stiff with such remarks as, "Well, you old swivel neck, whereya bin for the last 40 years?" "Hi, you ornary rope choker, how's things?" and so on and so on. Ed Cleveland and his official greeters introduced everybody to everybody. Roland Norris, the Macconian, set up facilities for impromptu quartettes and speech makers. Hudson Drake and his merry men dispensed conversation stimulators, and Otto Gillingham provided sizzling steaks. About all of these things we shall have more to say later.

The Origin of Cinco de Mayo

It was a great pleasure the other day to celebrate the concurrent birthdays of two of California's most reputable and altogether lovely citizens, namely and to wit, Jay Bush, the National Supply Company top ranker, and Bill Thornbury, the noted consultant and independent producer. These two gentlemen, and they are gentlemen in every sense of the word, were born on May 5 some several years ago and our neighbors below the border were so terrifically thrilled by the fact that they named the day in their honor, Cinco de Mayo. Unfortunately, Jay Bush was absent from the party, but he was toasted warmly nonetheless and a number of his friends, including Harry Long, Orrie Hedges, Peg Whealton, and Ed Bartosh, expressed their good wishes to him in a neatly worded telegram. Bill Thornbury's pleasure was somewhat marred by the avariciousness of Peg Whealton and Ed Bartosh. Personally, we think it is a pretty despicable thing to take money from a man on his birthday.

The Final Word

By way of last minute roundup, Woody Kreiger is off again to Peru where his operations are being conducted on one of the greatest fishing spots in the world. Incidentally, Liz Stark's amazing record was beaten recently by another lady who caught a black marlin at Cabo Blanco that weighed more than 1500 lbs. Roy Hitchcock is leaving shortly for a tour of Europe. Archie MacDonald will be home from his globe circling tour about the end of May. Which is all for now, remember there is a time and place for everything—and this is it!

A Texan, visiting in Australia, saw a kangaroo for the first time—and then drawled:

"Ah'll grant you one thing for sure. Your grasshoppers are bigger than ours."

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Field Development

Stanislaus County Lists New Wildcat

Stanislaus County is the setting for a new exploratory well undertaken by Dick Nance of the Tejon Hills Company in the Newman area. Designed as a Cretaceous test to a depth approximating 5000 feet, the well is tagged Stan No. 1 and located 660 feet north and east from the southwest corner of Section 15-7s-8e. Brown Drilling Company is doing the work. Magnetometer and geophysical activities were the work of J. E. Dick. Engineering is in the hands of Kemnitzer, Richards & Diepenbrock. The wildcat at this time constitutes the lone drilling job in Stanislaus County. Standard drilled and abandoned the previous solitary explorer several months ago near Modesto.

Word from Petrolia in Humboldt County indicated that Mattole Oil Company was preparing to move in rotary rig to take down from present depth of 625 feet its Chamber No. 1 wildcat on Section 21-1s-2w. The Texas Company's Maud Stanley No. 1 test on Section 20-2s-2e, east of Livermore, Alameda County, has been abandoned at 10,032 feet.

Trico Oil & Gas Company has abandoned the Blacklock No. 1 test on Section 19-4n-1e in Solano County at 7828 feet. Trico took over the project and redrilled after Shell gave it up. Arcady Oil Company is understood planning another well near its gas discovery at Liberty Gap.

Near the little town of Greenfield in Monterey County, Humble Oil & Refining Company's A. J. Zabala No. 1 wildcat is down 3500 feet. The well, on Section 34-18s-6e, is north of the San Ardo field. Santa Fe Drilling Company contractor is ready to embark upon the drilling of a series of core holes between Lodi and Sacramento in Sacramento Valley. Superior Oil has just spudded its Reclamation Board No. 3 on Section 7-3n-3e in the Rio Vista field.

Gas Hunt Widens

Richard S. Rheem is widening his search for new gas sources in Glenn County with a test named Pfeiffer No. 1, located near Hamilton City and six miles west of the Ord Bend gas field. On Section 26-18n-2w in the Princeton area of Colusa County the operator's Zumwalt No. 1-26 has been abandoned at 3500 feet. His Capital Co. No. 1-30 on Section 30-18n-1w is drilling at 1975 feet. Signal Oil & Gas Company's new work in the Sycamore Slough area will be Signal-Monterey Reclamation No. 3 on Section 29-12n-1e, Yolo County. General Petroleum's Glide Court No. 1 project on Section 10-7n-3e at Saxon is at a drilled depth of 12,638 feet and still fishing.

M J M & M Oil Company has farmed out its 5000-acre lease block in the south portion of the Camp Cooke military reservation in Santa Barbara County to Stansbury-Webb and George J. Greer, trustee. M J M & M retains a 50 per cent working interest in these lands which is subject to a 20 per cent net profits interest payable to others.

Slick-Moorman Producing Company is ready to drill its Palmer Stendel No. 4 well on Section 24-9n-33w at East Cat Canyon, where it recently completed No. 3 at 2985 feet. Sunray Oil's Bishop No. 1 on Section 7-4n-28w was last reported

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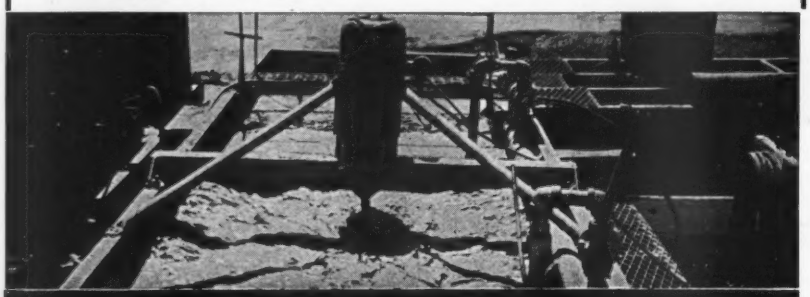

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At Sespe Canyon in Ventura County, Western Empire Petroleum Company's Church No. 1 on Section 33-5n-19w is drilling with cable tools below 300 feet. The company reported that two shallow wells were taken down on the property in 1917 and after producing some 35 gravity oil were destroyed by fire. On Section 19-5n-19w, Hi-Ko Oil Company has made location for No. 1 project.

The Eocene, expected around 5000 feet, is the target of Stansbury & Associates' deepening job on Lee No. 1 wildcat on Section 5-5n-19w at Squaw Flat. The well was started by Pathfinder Oil Company and carried by that operator to 2580 feet without encounter with much of interest. Idle since last July, Miller & York is contractor. At West Mountain Bill Thornbury has location staked for Henderson No. T-2 test on Section 23-3n-21w. Thornbury has started his King No. 6 on Section 1-3n-20w in the Bardsdale field. After going to a bottom of 8151 feet, Richfield is redrilling and diamond coring at 4300 feet or so with Janss No. 1 wildcat on Section 36-2n-20w at Conejo.

Oxnard Active

Standard has given the final touch to Lucas No. 1 on Section 1-1n-22w at Oxnard for a pumping yield from a redrilled depth of 9033 feet. Full capacity of the well to produce has not been determined. The company's McInnes No. 1 on Section 31-2n-21w is making hole at an intermediate stage. North of Standard's Livingston producer, Lloyd Corporation's Borchard No. 1 on Section 31-2n-2w is digging at 8230 feet.

Bolsa Chica and British American Oil since setting casing at 11,413 feet in their Hartman-Barnard Unit No. 2-3 in the Ventura Avenue field have taken in several hundred feet of the objective and prolific D-8 zone. Hartman No. 1, another combination job, is drilling well below 10,000 feet. The field is one of the largest in the state and it contained seven producing zones up to 1952. Tide Water Associated and Shell Oil not many months ago both drilled deeper in that part of the field and clicked with important D-8 production. Tide Water Associated's venture, about 150 feet from the Bolsa-British American line, came in for 1000 barrels of net oil daily. Some 300 feet from the combination's property line, Shell tapped the D-8 zone with a well good for 945 barrels a day. Bolsa divides its deep rights in the lease with British American.

Morro Bay Test

Drilling has reached 1600 feet with Rushing Drilling Company's contract work for Tide Water Associated at Morro Bay in San Luis Obispo County. Tagged Montadoro No. 1, the wildcat is on Section 3-31s-10e. On the Rancho Guadalupe field, Union has completed Leroy No. D-1 at 2940 feet for a pumping yield of 70 barrels of net oil a day. Orville Stanford Drilling Company took the project down on Section 2-10n-36w.

Union's development work in the Torrey Canyon field has been accentuated by completion of another producer, Torrey No. 99 on Section 5-

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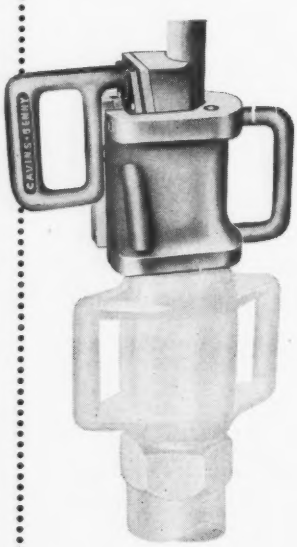

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3n-18w. Yield at last reports was 377 barrels of net 34.5 gravity oil and 237,000 cubic feet of gas a day. Torrey No. 95 on the section is drilling above objective depth. Northwest of the field, The Texas Company's Baker-Hunter No. 1 on Section 31-4n-18w or wildcat ground is some distance below the 10,000-foot level. South of Fillmore, the company's Kenneth H. Hunter River Ranch NCT-1 No. 1 on Section 36-4n-20w continues to dig at 4456 feet.

West Ojai has the attention of Honolulu Oil Corporation with its Honolulu-Sunray-Dunshee No. 1. Rocky Mountain Drilling Company, contractor, is making progress at 1200 feet.

Anaheim Wildcat Drilling On Down

Two and one-half miles northeast of the town of Anaheim on Section 1-4s-10w in Orange County, The Texas Company continues to drill ahead in the not so deep formations with Ruff No. 1 wildcat. The drill site is also one mile northeast of the Olive area, opened about a year ago by Texaco, where at this time the company has two wells going.

It appears that the Victor W. Posta, Operator, Estella No. 2 has probably opened a new fault block in the West Newport field. Located on Section 18-6s-10w, the well was taken down to a total depth of 2491 feet for a pumping yield of 214 barrels of 21.4 gravity oil a day, cutting slightly. At Richfield, Union Oil Company's Richfield Unit No. 1 on Section 28-3s-9w has been finaled at a plugged depth of 3570 feet for 51 barrels of 17 gravity oil daily and cutting initially 66 per cent. Gas yield was 30,000 cubic feet a day.

Wilson Oil Company is in the act of starting another test in the Huntington Beach area, tagged Mills No. 1 and located on Section 13-6s-11w. The company a few weeks ago recompleted its Talbert No. 2-4 on Section 14-6s-11w for a prime yield of five barrels of 14 gravity clean oil from 3935 feet. The well was originally completed last March for a yield beginning at the rate of 50 barrels of 14 gravity oil, cutting 16 per cent. On Section 11-6s-11w, Murphy Brothers and A. D. Rushing are digging under 1500 feet with their Brown-Henricksen No. 1 test. Southern California Petroleum Corporation's Gerhart No. 1 on the same section is a location as this is jotted down. Behr Oil Company is preparing to drill P & V No. 1 on Section 14-6s-11w. At Talbert, D. D. and Dorothy Dunlap are making progress with the drill several hundred feet below grass roots with Lamb No. 1 on Section 6-6s-10w. Contractor is Dunlap & Graham.

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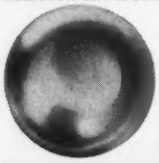

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Airport Test Works

At the north end of Long Beach, The Texas Company's Long Beach Airport NCT-2 No. 1 test is making hole well below 5000 feet. The project, on Section 2-4s-12w, near the intersection of Cherry avenue and Wardlow road, is a follow up job to the company's successful extension test. This earlier venture was carried to a total depth of 13,016 feet, plugged back to 9300 feet, and perforated in the interval of 8775-9040 feet. It then tested at the rate of slightly more than 190 barrels of 32 gravity oil a day. All wells in the sector are being whipstocked and slant drilled from neighboring locations. Pike Drilling Company is guiding the present undertaking to destiny.

Speaking of Long Beach, City Manager Sam E. Vickers has recommended setting up a $5,000,000 revolving fund to be financed by the city's tideland oil money. It would be used toward promoting formation of parking districts in mutual assistance with business interests. Vickers explained that this would require a charter amendment, as well as a vote of the people for the expenditure.

Del Valle Producer

Union Oil has placed on production its Lincoln No. 6 on its fee property in the Del Valle field. The well was recompleted at 6430 feet for a primary output of 495 barrels of 34.8 gravity oil and 1,038,000 cubic feet of gas a day from the Intermediate zone. Production last reported was at the rate of 307 barrels of 34.5 gravity oil, by way of 26/64-inch orifice, along with 509,000 cubic feet daily. Lincoln Petroleum, while on the subject, holds an approximate 13 per cent land owner's royalty in the Lincoln lease at Del Valle. Union's Barnes No. 20 on the section, meantime, keeps drilling deeper under 1800 feet.

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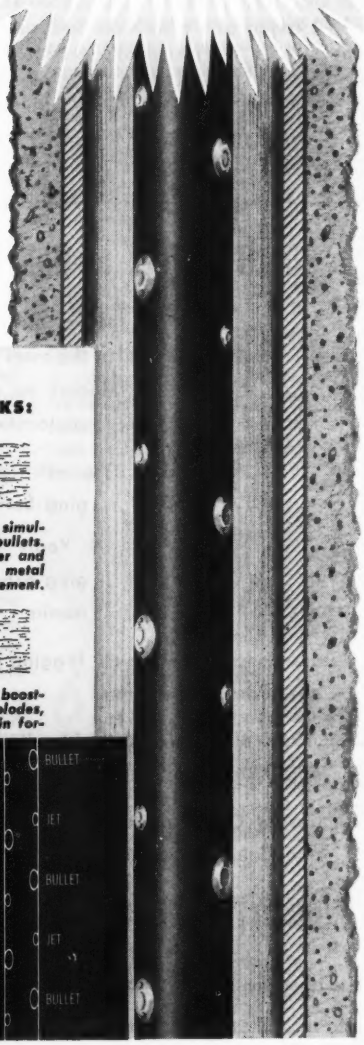
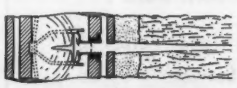


HERE'S HOW IT WORKS:



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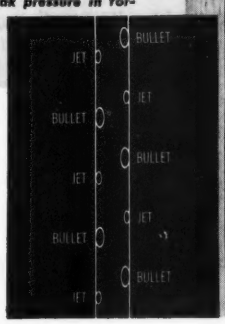

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bined in the interest of taking down a test well on a 1180-acre block in the Cascade-Aliso Canyon district of Los Angeles County. Last November the partners discovered new oil at Greenacres in Kern County. Their Los Angeles County wildcat will search for production from location some 700 feet north and 1000 feet east from the center of Section 25-3n-16w in the Rancho Ex Mission de San Fernando province. The leases were obtained from A. L. Howell and the Macson Oil Company, who put them together from Mission Land Company holdings. Teater entered the California production industry three years ago after scoring with outstanding successes in Michigan field. Wadley is widely known in Texas development and is also reaching prominence in California oil work.

In the Antelope area of Los Angeles County, John Q. Tannehill's No. 16-1 exploratory well on Section 16-8n-17w is drilling underneath 1200 feet or so, after a stop for equipment repairs. T. F. Vander Laan's No. 2 test on Section 30-2s-10w at Sansinena is drilling at an intermediate point. The No. 1 well on the section is pumping from a plugged depth of 3600 feet. Total bottom is 4843 feet. Terminal Drilling Company drilled the first well and is digging the second.

Sunray Drilling Two

Sunray Oil Corporation at this time is drilling two wells in the Newhall-Potrero field, 30 miles north of Los Angeles. They are RSF No. 123-7, a Loffland Bros. job, and RSF No. 124-7, a Sun Drilling Company contract assignment on Section 27-4n-17w. Commenting on the history of the field, Sunray told that to enter the field in Potrero Canyon, one must first pass through Pico Canyon where General Andreas Pico distilled oil as early as 1855. It was largely used for illuminating nearby San Fernando Mission. The oil was was gathered from seepages and hand-dug pits in the canyon near Newhall that now bears the Pico name. Potrero in Spanish means an enclosure for animals or the western corral. Sunray expressed belief that it was so named for the natural barricades of the Santa Susanna Mountains, which made it excellent grazing land for the expansive Rancho San Francisco, one of the early Spanish land grants, later sold at auction in the late 1880s.

At old Santa Fe Springs, Union is preparing to deepen its Bell No. 60 from present level of 6064 feet. Rothschild Oil Company has completed its Fee No. 1-A at 7707 feet for several barrels of oil a day. The Los Angeles County Board of Supervisors has authorized rezoning of a residential district in the Los Nietos-Santa Fe Springs area to allow commercial development of an intersection with a high business potential at Greenleaf avenue and Lambert road.

Riverside Test Drills

At Riverside County's San Timoteo Canyon area, S. V. Smith's Haskell No. 2 wildcat test on Section 35-2s-2w continues to drill near 600 feet. In the Yucca Valley area of San Bernardino County, Tampico Land Development, Inc., has reached 1200 feet with Retari No. 1 test on Section 25-2n-5e. The project was started originally by Retari Company, Inc.

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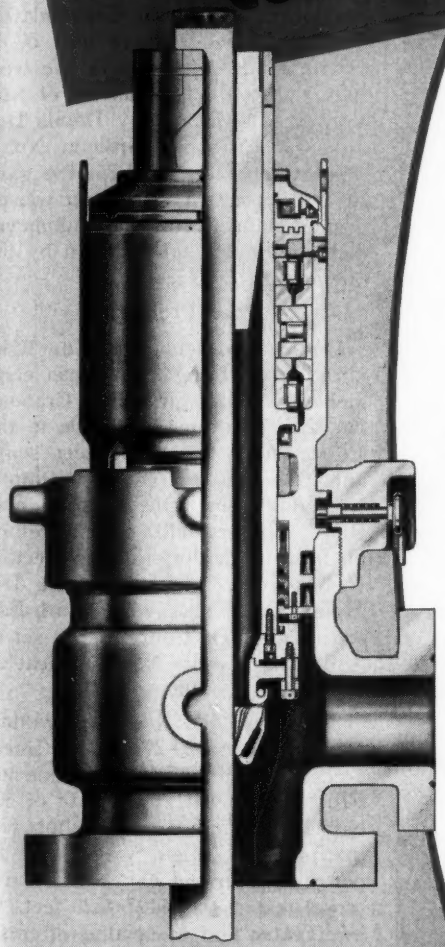
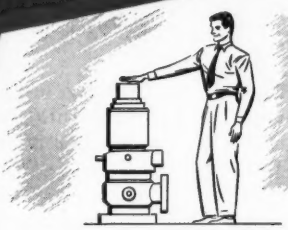
is the most advanced equipment yet perfected for automatic pressure control because it embodies *so many* unique advantages in *one* unit.

Moreover, its operating simplicity is unequaled. There's nothing to remember—or forget—when pressure emergencies threaten because this unit *automatically* seals off around the drill string as soon as the tools are lowered into the well...*and maintains this pressure-tight seal—without attention—throughout all subsequent drilling operations, including the adding or removing of drill pipe.*

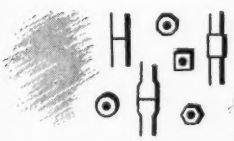


Two types Type 50 for drilling through 10¾" casing and larger — Type 51 for slim hole drilling, drilling-in, production jobs and remedial work. Both have same basic design features.

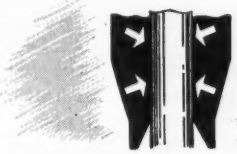


1 Space-Saving Compactness that permits installation under difficult space limitations. Even flow line connections are provided in the body—no spools or similar equipment are needed!

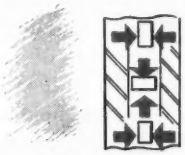
2 Full Opening Bore is provided for passing bits, reamers and other abnormally large tools by simply rotating the bonnet 1/6 turn. This locks—or unlocks—the internal mechanism so that equipment that will pass through the casing will also pass through the unit.



3 Any Shape Kelly — whether square, hexagon or octagon—is sealed off continuously while in the unit. Also, the varying diameters of the drill string—drill collars, subs, couplings, tool joints and drill pipe (whether flush joint, upset or coupled) all readily pass through the unit without losing the pressure-tight seal—because the Stripper Rubber **automatically** expands and contracts to pass them.



4 Continuous Pressure Protection is assured by the flexible Stripper Rubber which fits tightly around the drill string. No manual adjustments—no outside mechanical or hydraulic pressure—are necessary to maintain the seal while drilling, or while going into or coming out of the well.



5 The Stripper Rubber Rotates with the kelly—not one inside the other. Therefore, wear on the Stripper Rubber is negligible and a pressure-tight seal is maintained. In addition, all rotating loads are carried on separate thrust and radial bearings to withstand a combination of horizontal or vertical loads. Bearings are pre-packed with heat-resisting lubricant!

6 When Pulling Pipe out of the well, the Stripper Rubber continues to maintain its pressure-tight seal around the drill string while a patented barrier of steel latches prevents damage to the Stripper Rubber as couplings, tool joints and other variable diameters are pulled through it. This steel barrier also prevents the rubber from extruding under high well pressures.

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Sand Hills Wildcat Starts At Long Last

It was three or maybe four years ago when General Petroleum Corporation opened an extensive leasing campaign and tipped-off that it was interested in the prospective chances in that portion of Kern County. The tip has proved as true as a wise word that Determine would win the Kentucky Derby for General Petroleum is about to spud S. P. Tejon No. 16-3 on Section 3-11n-19w there. The derrick stands 990 feet south and 330 feet east from the west quarter corner of the section, slightly more than four miles north of production in the Tejon field and 20 miles south as the crow flies from Bakersfield. Expectations are that the company will not feel content until all formations have been scrutinized to at least a dozen thousand feet in the primary move to develop no less than 5000 acres from both the Miocene and the Eocene. A glance at the map revealed that General's ambitious test is approximately four miles southeast of a wildcat well taken down and abandoned just short of 15,100 feet by Western Gulf in 1947. An inharmonious note in late field work of the company in Kern County was provided by a duster at West Mountain View and exemplified by Giumarra No. 15-24 on Section 24-30s-28e. This deep inquisitor went "kaput" at 10,509 feet.

Shafter Gas Test

The goal of Tide Water Associated Oil Company's new test in the Shafter area is gas rather than oil. The company the other month abandoned a 12,563-foot test, which let out no oil showings of commercial worth, but pointed to likely natural gas production from a zone around 4300 feet. The fresh test, Stone No. 1-18-1, is on Section 18-28s-25e or about two miles west of Shafter. It is also about 1900 feet northwest of the deep duster. On Section 17-28s-25e, northeast of the abandoned test, Superior Oil Company's Russell No. 73 is digging at 3400 feet.

Superior, incidentally, is drilling above objective depth with its KCL No. 71-36 test on Section 36-30s-26e at Old River, the next act following completion of its third producer in the field, KCL No. 11-36. The latter is putting out 100 barrels a day from 8248 feet under restrictions of an 8/64-inch bean. Superior opened the field around last Christmas with its No. 51-36, which gave practical season greetings with an initial flow of 111 barrels of clean 36.3 gravity oil from Stevens oil sand straddling the 8100-foot level.

Miller No. 1, a shallow Eocene discovery well sponsored by Gilliland Oil Company and H. F. Ahmanson on Section 3-25s-18e at Dagany Gap in northwest Kern County, continues its excellent behavior with a flow of 114 barrels of 23 gravity oil a day from 1670 feet. It was a Burke Drilling Company contract task. Costs of the play were financed dollar for dollar by Gilliland and Ahmanson. The last mentioned is interested in many other businesses and is president of the Home Savings and Loan Association, the largest company offering such services in the country. Held by the Gilliland-Ahmanson combination are 320 acres framing the new find. Bandini Petroleum Company, which is drawing plans for a drilling job, owns 320 acres in Section 3 and a 9/20th interest in the east half of Section 4. Universal Consolidated, so often around where new oil is found, holds 480 acres in the west half and southeast quarter of Section 10. In the nearby Devils Den area, G. Graham's Graham No. 5 wildcat on Section 23-25s-18e gave up at 1065 feet. The drill site was no great distance from an abandonment well previously taken down by the operator to 7700 feet.

Nozu Promotion

Dumm Brothers Petroleum Corporation of Long Beach has commenced drilling its Doc Crandall No. 2 on Section 17-30s-29e in the Edison field, some 500 feet south and 100 feet east from the operator's No. 1 discovery in the Nozu oil sand. Rudi Monterastelli is understood planning a drilling job on Section 16 on 40 acres acquired from Des Moines Oil Company. At South Edison, Walter De Courcy is all set to drill Marsh-Greve No. 1 wildcat on Section 34-30s-29e.

Standard Oil's No. 15-20 wildcat test on Section 20-29s-27e at Greenacres between fields at Rosedale and Fruitvale flowed at the rate of 500 barrels of fluid a day on a short formation test. Yield was about 80 per cent water and 20 pr cent oil. Interval tested was 4497-4520 feet. C. W. Teater and associated interests developed the first production at Greenacres last fall. He subsequently sold a portion of his stake in the lease to Trico Oil & Gas Company, and Gene Reid Drilling Company, Inc.

A test well at Race Track Hill has come through for Franco-Western Oil Company. Drilexco-Kruger No. 52-7 on Section 7-30s-29e is pumping 60 barrels of oil a day from a total depth of 6575 feet. The Wicker was

The Texas Company's Elkins B-1 in Shiells Canyon with B. J. & M. Drilling Company putting down the hole. Left to right: R. H. Graham, derrick; Homer Boyt, driller; W. W. Boyt, cathead; G. C. Gibson, lead tong; Bill Baldwin, racker.

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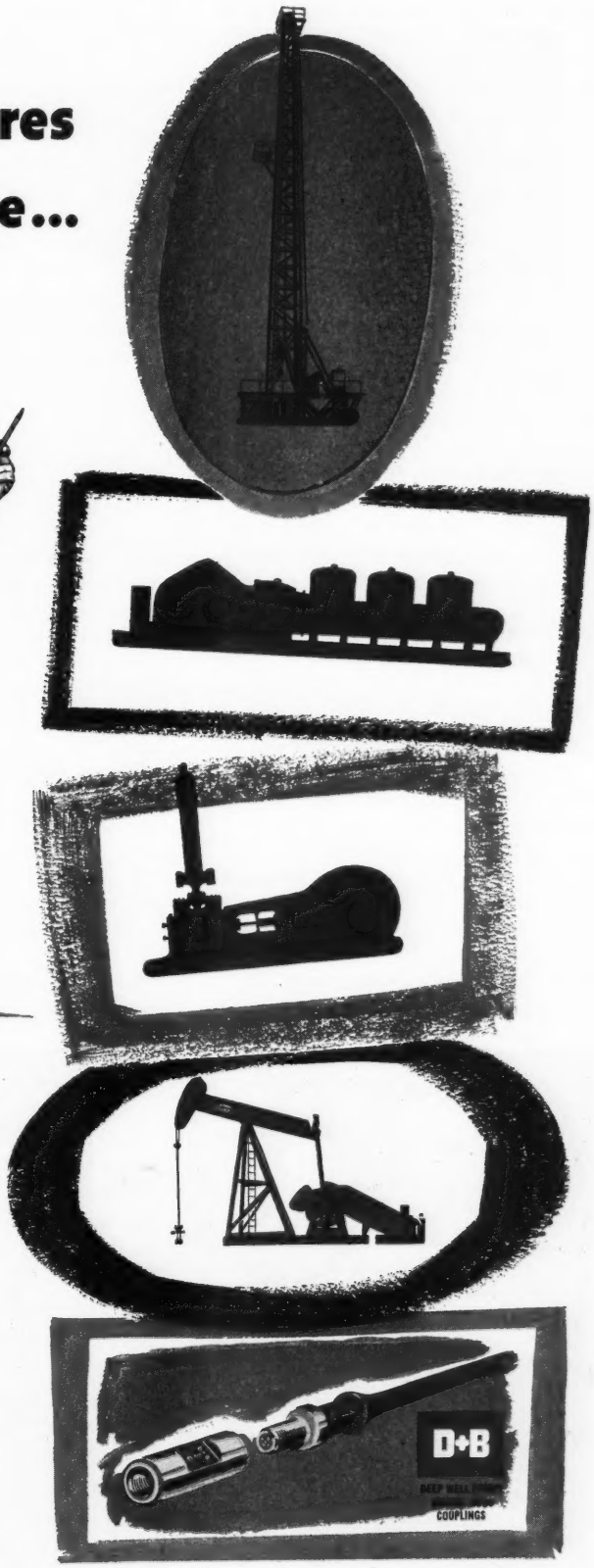

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topped at 4485 feet and the Vedder at 6480 feet. General Petroleum's Baughman No. 84-8 on Section 8 keeps drilling at 2900 feet. J. Paul Getty's Alexis No. 3 on Section 17 is below 1000 feet.

Golden Bear Oil Company is doing preparative work for its KCL No. 82A-33 on Section 33-29s-27e on the western fringe of the Fruitvale field. Location is one-half mile north of a well taken down by Golden Bear last March to an unproductive 4675 feet. East of Kern Bluff, Ferguson & Bosworth's Jameson No. 1 wildcat on Section 20-29s-29e is an abandonment at 1517 feet, a sequel to drilling gray sand in the Santa Margarita zone. Northwest of the Belgian Anticline field, Honolulu Oil's Honolulu-Watson C. W. O. D. No. 5 on Section 23-30s-21e found no oil to write about to 5903 feet and quit. The Pleito Hills area also registered a duster. It was Richfield's San Emidio No. D-3 on Section 32-11n-21w, which showed but little oil signs to 6416 feet.

Greeley Test Spudded

Sunray Oil is digging rapidly ahead toward objective depth after spudding in its KCL No. 21-30 wildcat on Section 30-29s-26e, south of the Greeley field. On the Cienega Anticline, T. & T. Oil's Klipstein No. 2 test is drilling beneath 1200 feet. Drilling duties are in the hands of the California Commercial Drilling Company.

In the Morales field in the San Luis Obispo County part of Cuyama Valley, Margaret V. Kahler has clicked with her No. 1 well on Section 10-11n-28w. The well at last reports was accounting for 50 barrels of 30 gravity oil a day from 2117 feet. No. 2 is at completion level.

Six miles southeast of Corcoran townsite, C. W. Colgrove's Green No. 48-26 exploratory well is drilling well below 1200 feet, after setting surface pipe at 550 feet. The well, a Casner & Bentz contract job, is about two miles northeast of Green Cattle Company No. 1 wildcat. This earlier explorer originated operations under the banner of Elmer C. von Glahn. At 5500 feet it was taken over by Pacific Western and carried to 9050 feet before abandonment in December of 1948. Along the Bakersfield-Porterville highway in the Deer Creek area north of Terra Bella, J. W. Douglas is approaching 1000 feet with Hornbrook No. 1 wildcat on Section 27-22s-27e.

With the Los Nietos Company acting as operator, a voluntary unitization program among six companies sharing in 1360 acres in the Coalinga Nose field of Fresno County has gone into effect. Los Nietos drilled the Vaqueros oil sand zone discovery two years ago, the formation involved in the new operating agreement. The discovery well began flowing at the rate of 1300 barrels of 38 gravity oil daily from 6449 feet. The well, however, was shut in shortly after the final touch awaiting formulation of the unit plan. It is now about ready to go back on production. Members of the unit group are Standard, McAlester, Superior, Seaboard, Honolulu and Los Nietos. Speaking of Coalinga Nose, the field was discovered in the summer of 1938 by a well drilled by Robert S. Lytle to the Gatchell zone of the Eocene formation.

In the North Kettleman Hills area Artnell Company's L & W No. 88-14 wildcat venture is near the drilling stage on Section 14-21s-16e. Prospecting is likely to endure to 9800 feet or thereabouts.

Union has completed its fourth producing well in the Guijarral Hills field. Whittemore No. 6-26 on Section 26-20s-16e came in flowing at the daily rate of 1499 barrels of 38.2 gravity oil and 912,000 cubic feet of gas a day. Oil produced was cut 8.3 per cent initially. Santa Maria Drilling Company did the chores.

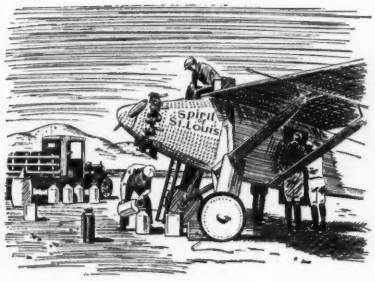
Fern Canyon Test

Drilling has been initiated in Intex Oil Company's Sauret No. 1 wildcat in the Fern Canyon area, two miles west of Paso Robles in San Luis Obispo County. Intex along with Wilrich Development Company holds some 1000 acres in the area. Elmer C. von Glahn & Associates' Washburn No. 1 wildcat on Section 36-32s-20e at South Carrizo has reached 1200 feet and is drilling ahead. At Black Canyon in San Benito County, Standard's Eade No. 27-35 test on Section 35-18s-9e is drilling at 2500 feet, with Miller & York in charge. Two Madera County wildcats have gone the prescribed path for dusters. Success Oil's Andrews No. 1 on Section 32-10s-18e near Madera quit at 2200 feet. Gene Reid Drilling's No. 26A-21 on Section 21-12s-15e in the Firebaugh area came to naught at 4155 feet.

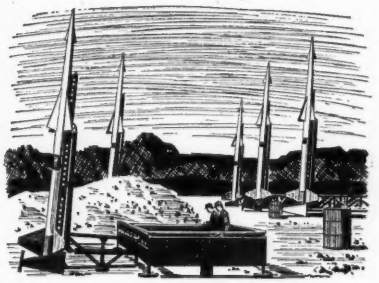
In the Alpaugh area of Kings County, the W. W. Holmes, Operator, Carpenter No. 1 on Section 33-23s-22e has been shut in after flowing gas at the daily rate of 1,390,000 cubic feet a day. The well is bottomed at 3550 feet and has 5½-inch casing set at 2850 feet. The operator has locations staked for three additional wells at Alpaugh.

Sunray's Oil Corp.'s well 121-6 in the Newhall-Potrero field, with Sun Drilling Company handling the work. Left to right: O. B. Burkhart, derrick, H. A. Barbarick, cathead; J. N. Vlach, lead tong; R. W. Beck, racker; R. L. Billingsly, driller.

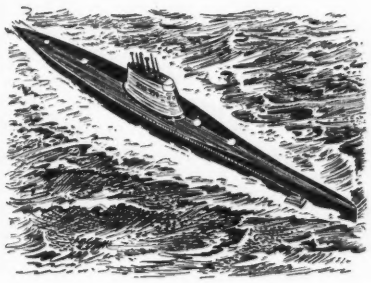
First oil industry 8-hour day was introduced by Standard in 1917. This was a major step in our employee relations programs which include health, pension, insurance benefits and a stock purchase plan—95% of eligible employees own Company stock.



On Lindbergh's trans-Atlantic flight in 1927, we fueled "The Spirit of St. Louis." Now, safer airliners, faster military planes mark aviation progress which Standard's research has served. Now we're making fuels for tomorrow's jets and rockets.

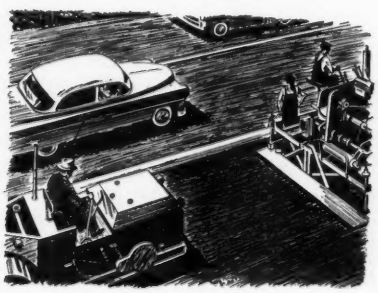


New power for transportation and industry was born in 1935 when Standard's first compounded diesel lubricating oil made high-speed diesel engines a practical reality. Now our scientists are working on lubricants for the first atomic submarine.



Making housework easier, Standard made detergents available for "soapless soaps" in 1946. Later we produced the basic ingredients for wrinkle-proof clothing for men and women, adding again to the more than 1100 products we make from oil.

We pioneered peace-time use of atomic energy. In 1950, using radioactive piston rings, Standard measured engine wear as it occurs, used this research to develop better motor oils, including a new oil so superior it can boost gas mileage up to 15%.



The promise of the past is an even better future

You wear a suit woven from oil, drive on tires born in a refinery, whisk over asphalt super-highways, read about kerosene-powered planes that crack the sound barrier. And you live in a West far beyond the dreams of those 1879'ers who formed the Company from which Standard grew.

What lies ahead? If the past is any clue, oil will be saving you more work and money, improving your transportation and putting more luxury in your living. And Standard will continue to play a big part in this progress as we follow our 75-year tradition of planning ahead to serve you and the nation better.

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Personalities IN THE NEWS

Morton Named Division Manager for Halliburton

Tom E. Morton, division manager of Halliburton Oil Well Cementing Company, who recently moved here from Houston, Texas, is a native of Okmulgee, Oklahoma, and a graduate in petroleum engineering of the University of Oklahoma at Norman. He had really become pretty well indoctrinated in the oil business before attending college, since for some five or six years prior to that time he had worked in the oil fields of his native state in various types of production activity. After graduating, he functioned for some time as chief engineer for an independent operator, largely supervising secondary recoveries in the Seminole and Shawnee areas.

Tom E. Morton

He started with Halliburton in 1941 as a truck driver, tester, cementer, etc., but his career was interrupted by service in World War II during which he spent some time with the armed forces in the South Pacific. When he returned he took over at Wichita Falls as field engineer and thence progressed through a series of elevations to division engineer in the North and West Texas fields. He was moved to Dallas as division engineer in 1950, was promoted to assistant division manager, and later was transferred to Houston in the same capacity. He took over as division manager in the Los Angeles area in March of this year.

Extra curricularly, Tom is an enthusiastic golfer who shoots consistently in the low 100's. He has always been active in API, AIME, the Nomads and other industry organizations. He has a lovely family of five, now lives in Santa Monica and is enjoying his new experience immensely.

Lieut. Colonel C. Fred Liebrecht of the U.S. Army, formerly with the Signal Oil Company sales department at Los Angeles, has been assigned to new military duties as artillery advisor for a National Guard unit in New York. In a recent visit to Los Angeles, he mentioned that his new address is 1242nd Army Service Unit, New York National Guard Advisory Group, New York, N. Y.

Maury Machris, veteran California oil man, rented the Ebell Theater in Los Angeles for two consecutive nights to assure that none of his friends would miss seeing the films shot by him on the recent hunting safari in Africa.

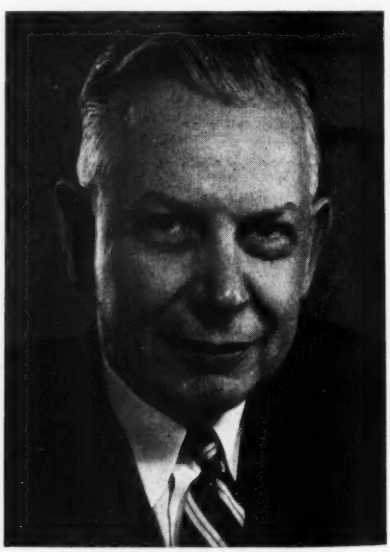
Oil men aver the greatest party they ever attended was the gay and festive affair held the other week at "Rancheller" along coast highway 101, one mile north of Shell Beach, San Luis Obispo County. Host was genial Al Heller, whose most famous oil stint was the leasing of extensive lands at Cuyama Valley prior to the fabulous discovery and ensuing development there.

Jayne Elected Vice Pres. of Standard

Election of F. M. Jayne as a Vice President of Standard Oil Company of California was announced recently by R. G. Follis, Chairman of the Board of Directors.

Jayne, Secretary of the Company's Executive Committee, joined Standard as a clerk at the Richmond Refinery in 1934. He was graduated with a B.S. degree from the University of California in 1933 and obtained a Master's Degree in 1934 in Business Administration.

Jayne served in the Air Corps in World War I and with the Petroleum Administration for War in Washington in World War II.



F. M. Jayne

After holding several positions of increasing importance in the Manufacturing Department, he was appointed Assistant Comptroller in 1947 and two years later was made Secretary of the Executive Committee.

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Williams Elected President of Pike Drilling

Stanwood I. Williams, formerly Executive Vice-President of Thomas P. Pike Drilling Co. of Los Angeles, has been elected President of the company, according to an announcement by the Board of Directors of the concern.

Stanwood I. Williams

The election fills the vacancy created by the resignation of Thomas P. Pike, recently named Assistant Secretary of Defense by President Eisenhower.

Howell G. Haney, Vice President of the company in Charge of Operations, was named also to a newly created post, Chairman of the Executive Committee of the Board of Directors.

Gene Graham, Vice President of the organization, was elected to the position of Executive Vice-President vacated by Williams. Graham was also named to the Board of Directors and will serve on the Executive Committee of the Board along with Stanwood I. Williams, the new president and the chairman of the executive committee, H. G. Haney.

Mr. Williams has been a resident of Pasadena for the past twelve years. He is a native of California and a graduate of Stanford University where he took his degree in geology. He is one of the original directors and organizers of the Petroleum Club. He is well known in the contract drilling industry of California having been an officer of Thomas P. Pike Drilling Co.

Jameson Advances at Union

Walter T. Jameson has been appointed superintendent of the Santa Maria refinery which Union Oil Company plans to build in San Luis Obispo County, California, it was announced by K. E. Kingman, vice president in charge of manufacturing.

Mr. Jameson joined Union Oil in June, 1940, as a chemical engineer. He was graduated from Stanford University in 1938 with an A.B. in chemical engineering and received his M.S. from the Massachusetts Institute of Technology in 1940. He progressed through the regular training program at Union's Oleum refinery and in January of 1944 was transferred to the Cut Bank refinery in Montana as assistant superintendent. This was followed by an assignment at Oleum refinery as assistant superintendent of distillation from January 1947 to November 1951 at which time he was transferred to the Los Angeles refinery where he was assistant superintendent of cracking for a year and a half, followed by assignment to operations department as assistant superintendent.

Mr. Jameson is a native Californian (born in Corona, California), is married and has three children—two boys and a girl.

McEnroe Named Treasurer of Halliburton

Election of G. D. McEnroe as Treasurer of Halliburton Oil Well Cementing Company is announced by President L. B. Meaders. The new treasurer fills the vacancy created by the death of Hugh H. Leonard.

McEnroe joined Halliburton in 1940 as a tax accountant at Halliburton's Duncan, Oklahoma headquarters. He then filled the posts of chief tax accountant and assistant treasurer.

As Treasurer McEnroe is in charge of taxes, credit, traffic and treasury departments for Halliburton. A native of St. Marys, Kansas, he studied accounting at the University of Kansas, worked for an accounting firm and Kansas' income tax division before joining Halliburton.

Executive Promotions Announced at Reed Roller Bit Company

At the annual meeting of the Board of Directors of Reed Roller Bit Company, Stephen P. Farish was named to the newly created position Chairman of the Board. Other promotions announced at the same time elevated R. G. Hamaker to president, succeeding Mr. Farish, and H. C. Tooley to executive vice president.

The directors also designated W. B. Noble as first vice president in charge of engineering and E. F. Snow as second vice president and treasurer.

R. G. Hamaker

Mr. Farish had been president of Reed Roller Bit since 1925, following the purchase of the company by a syndicate composed mainly of Houston businessmen headed by Mr. Farish. At that time the firm employed less than 80 people and occupied some 34,484 square feet of shop and office space on an 11-acre tract along Navigation Boulevard.

Today the company provides jobs for approximately 2000 workers. The plant has expanded to nearly half a million square feet on a 27-acre tract. It distributes annually more than 27 million dollars worth of oil well drilling tools to every part of the world where there is petroleum activity.

Mr. Farish's 30 years of service date from 1924 when he was a partner in a small oil tool company later absorbed by Reed. Prior to their promotions, Mr. Hamaker, who has

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Shell-discovered additive, TCP*, blended into Shell Premium Gasoline, breaks through power barrier set up by pre-ignition and spark plug "miss"

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WHETHER yours is a new car barely past the 2000-mile mark—or an "old faithful"—it's almost certain that you're getting less response than you should when you step down on the accelerator—*as much as 15% less.*

The power barrier

There's a wall between you and full engine power. It is caused by lead and carbon deposits that glow red hot in combustion chambers to pre-ignite fuel *before* the piston is in proper firing position.

These same deposits form on spark plugs and act as electrical conductors to short-circuit them. Then your spark plugs misfire.

These twin power thieves, pre-ignition and misfiring, are most active when you need power most, during acceleration or on hills.

TCP, the unique Shell-discovered fuel additive, corrects both pre-ignition and misfiring. It "fireproofs" deposits in the combustion chamber, prevents them from glowing red hot to pre-fire fuel. It makes the deposits on spark plugs nonconductive, and ends misfiring.

TCP breaks through barrier—fast

So quickly does Shell Premium Gasoline with TCP go to work that you'll feel the difference—up to 15% more power, more acceleration—by the time you've driven 400 miles. But engine deposits accumulate constantly. Continued use of TCP additive is necessary to maintain your power and performance gains.

Shell Premium Gasoline with TCP is the greatest gasoline development since the discovery of tetraethyl lead. It is available only at your Shell Dealer's.

*Shell's Trademark for this unique gasoline additive developed by Shell Research. Patent applied for.

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been with the company nearly 26 years, was vice president in charge of sales, and Mr. Tooley was vice president in charge of manufacturing after 17 years with Reed. Mr. Noble and Mr. Snow have been part of the Reed organization for more than 18 years.

During Mr. Farish's tenure as president, assets of Reed Roller Bit have grown from one million dollars to nearly 24 million, and the company has never failed to pay the annual dividend since 1927.

Mr. Farish gives credit for the growth and success of the Company to the management team he has assembled. Commenting on this, he explained that as president he gives department heads free rein after having set the direction and the objectives. An operating committee meets twice monthly to iron out mutual problems and maintain close liaison between the various divisions of the business. By giving his executives free hand within the scope of their operations, Mr. Farish believes he gets increased efficiency, more initiative, and quicker decisions.

All of Stephen Farish's professional life has been spent in the oil business. He started in 1908 when he interrupted his schooling at the military academy at Sewanee, Tenn., to work for the E. F. Simms Company in Texas as a roughneck for nine months before returning to school.

In 1913 he left the University of the South and returned to the Texas oil fields. He served as driller and tool pusher in oil fields in Texas and Louisiana. In 1915 he moved to Humble as driller for R. L. Blaffer and Will Farish, his brother, later becoming production manager.

It was at Humble that Steve Farish first encountered what was later to be known as the Reed Roller Bit, but what was then the Humason Bit. G. A. Humason, the inventor, credits S. P. Farish as one of the first drillers to use the bit. It was on the fabulous Paraffin 40 acres, and the slush-lubricated bit made nine feet of hole in two hours, a good showing.

When Humble Oil and Refining Company was formed in 1916, Mr. Farish was one-third owner of the Globe Refining Company, one of the companies of which Humble was formed. He was manager of Humble's northern division when he resigned in 1922 to form a drilling contracting company in partnership with Joe Collins and Ed Watts. This partnership grew to where it operated 21 rigs. Farish was president. The company later became the Navarro Oil Company, which was sold to Continental Oil Company in 1945.

In 1925 Farish joined with the syndicate that purchased the Reed Roller Bit Company from C. E. Reed and became president of the reorganized tool company. C. E. Reed, in 1917, had been licensed by Caddo Rock Drill Bit Company to manufacture the Humason bit that Steve Farish had first tested in the Humble oil field, two years before.

Mr. Farish is married to the former Lottie Baldwin Rice. They have a son, Stephen Power, 2nd, and a daughter, Mrs. James K. Cogswell, III.

C.N.G.A. June Frolic

Fred G. Carter, Entertainment Committee chairman, announced the completion of arrangements for the Annual C.N.G.A. June Frolic which is to be held Saturday, June 5, 1954 at the Rio Hondo Golf Club in Downey.

A day devoted to sports, good fellowship and entertainment will be the menu served up to the more than 800 expected to attend. The early risers will be able to tee off for the many golf prizes at 7:30 a.m.

Fred G. Carter

Those not so inclined will be able to participate in horseshoes, volley ball and other contests of a less strenuous nature.

Featuring the afternoon festivities will be another meeting on the baseball diamond of the Swashbuckling Peddlers and the High Octaners that usually involves the services of more comptometer operators than ball players.

Barbecued beef with all the trimmings will set the stage for a wonderful show under the Big Top.

Committeemen assisting Carter in the program arrangements are: Bill Buehler, Crosby Steam Gage & Valve Company; Harold Dresser, The Marley Company; Les Gfeller, General Electric Company; Al Norgard, Southern Engineering & Construction Company; Art Jenkins, Cooper-Bessemer Corporation; Walt Penner, Worthington Corporation; Bill Runbeck, Guy T. Martin & Company; Ron Wilson, Daniel Orifice Fitting Company, and Ray Babb, Howard Supply Company.

Jerry Stumm Resigns

J. B. Stumm announces his resignation from Byron Jackson Co. effective May 1st. As Assistant to the General Sales Manager, he also directed advertising and sales promotion for the oil tool, rubber products and Dempsey divisions of the company. No announcement of future plans is available at this time.

Standard Oil Company annuitants evidently are imbued with love of life for they live happily and long. The oldest annuitant is James M. Perry, 94, Broderick. Next in line is Frank Feuille, 93, El Paso, Texas; William W. Culler, 89, Glendora; James C. Stokes, 89, Albany; and H. C. Conkhite, Carlton; Charles Jacoby, Anaheim; William C. Learmont, Los Angeles; and R. C. Warner, Piedmont, all 88 years young.

Bill Geis, who shook the dust of Los Angeles off about six months ago and departed on a year or more tour of Europe and other points abroad, currently is comfortably ensconced in Rome, Italy. He plans to return to geology and oil producing sometime around next Thanksgiving Day.

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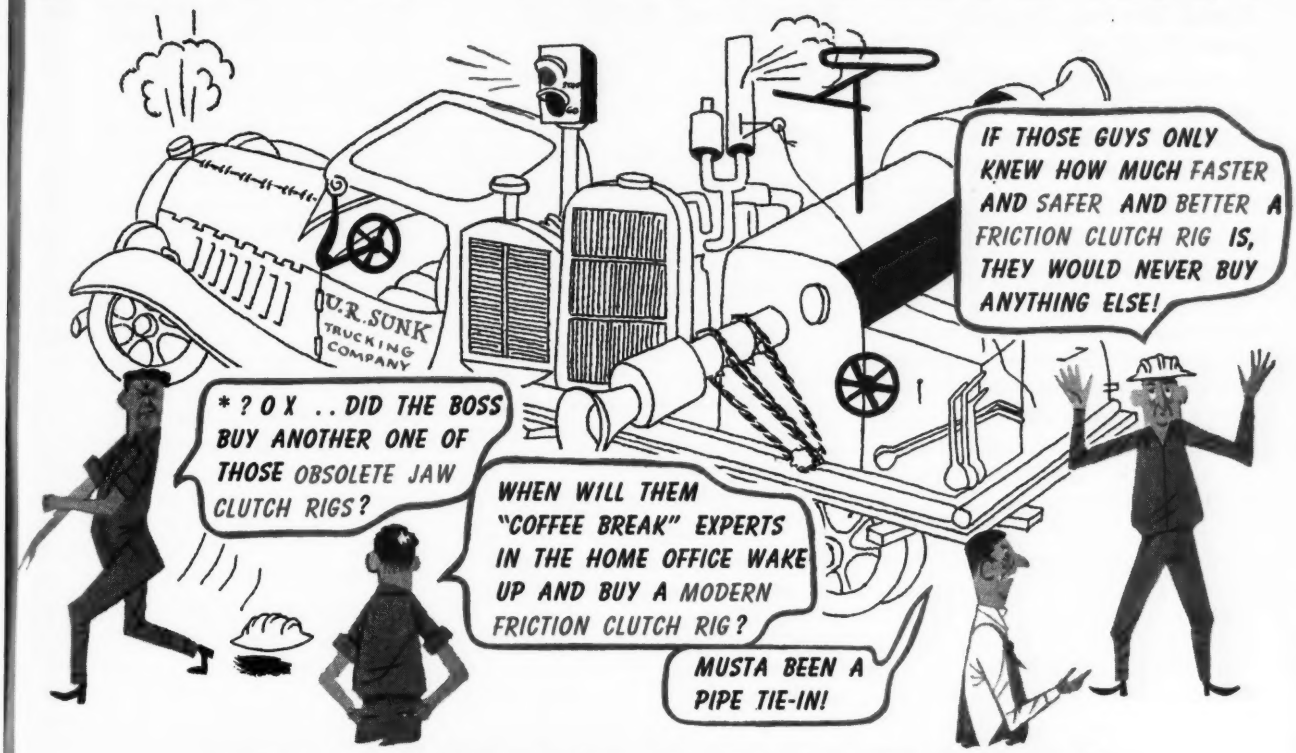
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Frank Morgan Resigns from Richfield

The resignation of Frank A. Morgan, Vice President and Manager of Exploration of Richfield Oil Corporation, to become effective early in June, was announced recently by Chas. S. Jones, President.

Immediate plans, following his resignation, include only "a long delayed vacation in Alaska," but he will continue to be active in the oil industry, possibly as an independent consultant, Mr. Morgan said.

"I know that in whatever capacity he may serve, Mr. Morgan will continue to make valuable contributions to the oil industry," Mr. Jones said.

Morgan has served as Vice President and exploration chief of the rapidly growing Richfield organization since the formation of the company in 1937. Prior to that time he was chief geologist for the Rio Grande Oil Company which he joined in 1929.

He has been closely identified with the discovery and development of many of California's oil fields. Active in oil exploration work for the last 33 years, he has had broad international experience. He has been recognized throughout the industry for his outstanding record and, in 1951, he served as President of the American Association of Petroleum Geologists, a professional organization of world wide membership.

"Our exploration department has earned recognition as a well organized team," Morgan said, "and with the present members of the staff, the company's policy of aggressive oil finding will be in capable hands."

After following doctor's orders with several days' rest at Queen of of the Angels in Los Angeles, Clair Gibson is once more up-and-around and punching down new wells.

Morton Sterling, Sunset Oil Company executive vice president in Los Angeles, has been elected a director of the Independent Refiners' Association of California, Inc. He was named to serve for the unexpired portion of the term of former president and director, C. A. Johnson, deceased.

Kelton Heads B.S.&B. Oil Field Sales

Black, Sivalls & Bryson, Inc., announce the appointment of Lee Kelton as Manager of Oilfield Sales, according to Floyd C. Myers, Manager, Oilfield Sales & Service Division. The appointment places Kelton in charge of field and city sales activities in the twelve BS&B district sales territories covering the oil country.

Kelton, formerly District Sales Manager, Casper, has served Black, Sivalls & Bryson in a wide range of capacities over the past eighteen years. He has risen "through the ranks," starting as branch clerk in Houston in 1935. Working his way into customer contact, he represented BS&B in Odessa and Hobbs for several years, before becoming Branch Manager at Lafayette. In 1946 he was named Branch Manager at Casper, and shortly thereafter, Assistant District Manager for that area. In 1947, Kelton became Regional Sales Manager for the Rocky Mountain area, and when the newly-created Casper sales district was formed in late 1952, he became its first District Sales Manager, supervising sales activities in Wyoming, Montana, North and South Dakota.

Having represented BS&B in many of the major producing areas of the country, Kelton brings to his new assignment a broad background of experience in sales and management. He will headquarter at Oklahoma City, general offices for the Oilfield Sales & Service Division.

BS&B serves oil industry customers through a network of over sixty branches and sales offices, located throughout oil and gas producing areas. The company, fabricators of oilfield equipment for over sixty years, manufactures a complete line of wellhead production, natural gas processing and storage equipment.

Black, Sivalls & Bryson, Inc., announce the appointment of Lawton L. Laurence as Manager of Engineering, Oilfield Division. Promotion to the newly-created engineering post places Laurence in charge of a great broadened engineering program, including expanded engineering research and product development activities, according to Chester A. Siver, Vice President and General Manager of Engineering.

Laurence began his career with BS&B in 1941, upon graduation from the University of Oklahoma, where he received the degree of B. S. in Petroleum Engineering. A number of the engineering staff until World War II, he left to become an engineering officer in the United States Navy. After a short period of employment in the Research Department of the Carter Oil Company after the war, he returned to BS&B as research and development engineer and worked on the development of dehydration and other gas processing equipment. In 1950, Laurence became Chief Engineer of the Oilfield Division, a post which he left in late 1952 to become Sales Manager of the Division.

Mr. Laurence is the author of a number of published technical articles on gas dehydration and low temperature separation of oil and gas condensate, and enjoys the reputation of being a leader in this field.

McMillan Elected Pres. of Fullerton

The Board of Directors of Fullerton Oil Company announces that John R. McMillan has been elected president to succeed W. W. Valentine who resigned following the sale by the Valentine group of their interest in the company.

McMillan was graduated in mechanical engineering from California Institute of Technology in 1931, and has had an interesting and diversified experience in the oil business. He began his career with Barnsdall Oil Company as a draftsman while attending college, and subsequently served some fourteen years with that firm in responsible positions in the production and exploration departments.

He joined the staff of Fullerton Oil Company in 1943 as petroleum engineer and assistant manager of field operations, and some four years later was named vice-president and director in charge of production and exploration. This year he was honored by being elected chairman of the Petroleum Branch A.I.M.E.

Rocky Mountain NEWS

Colorado—Idaho—Montana—New Mexico—Utah—Wyoming—Western Canada

Montana

A sale of lands on the Blackfeet Indian reservation in Glacier County has been scheduled for May 26. It will comprise 71,204 acres.

J. Ray McDermott has staked location for a 6500 foot Mission Canyon test in Treasure County. The well will be the No. 1 Kelly, c sw ne 34-4n-34e. In Hill County, McAlester Fuel and Goldston Oil will drill a Madison test scheduled for 3700 feet at the No. 1-A Rambo, c sw sw 35-31n-12e. It is in an unexplored area.

Atlantic Refining will drill the No. 1 Probestal, nw ne nw 25-9s-24e, in Carbon County. It will be a 5700 foot Tensleep test. The wildcat is three and a half miles northwest of the Frannie field.

Shell Oil Co. has staked location for a 9000 foot test in the Coral Creek Unit in Fallon County, on the Cedar Creek anticline. It will be the No. 32-22 Unit, c nw se 22-6n-60e. This location is 24 miles southeast of the operator's Cabin Creek discovery.

Sun Oil and Eramont Petroleum and associates were continuing swabbing operations at the No. 1 Beagle Land and Livestock, ne sw sw 17-23n-59e, in the North Sidney area of Richland County.

Construction of a refinery in Montana is under consideration by C. H. Murphy Corp. of El Dorado, Ark. The company has production in the East Poplar field. Final decision will await further surveys and a study of possible pipeline outlets.

North Dakota

California Co. was continuing drill stem tests of the No. 1 Rough Creek Unit, nw ne 13-148n-98w, in McKenzie County, after recovering a small amount of distillate and oil and gas cut mud from the Madison at the interval 9895-9937 feet.

W. H. Hunt will drill another in a series of Devonian tests on farmouts from the Stanolind Oil and Gas and the California Co. It will be the No. 1 Newman, sw sw 33-152n-82w, in Ward County. The same operator found heavily oil cut mud on a drill stem test of the Madison at the No. 1 Gohrick, se se 15-158n-95w, in Williams County, and was last reported setting casing and perforating. The well is on a farmout from Pure Oil Co.

In an area which has seen only one previous test, A. J. Scott and Ben Larson have staked location for the No. 1 Scott, ne ne 15-151n-53w, in Grand Forks County. A test 10 miles to the northeast, the No. 1 Berg, was abandoned after being drilled to 1665 feet.

Carolina Hunt Trust Estate et al will drill the No. 1 Fuller, sw se 6-136n-73w, in Logan County on a farmout from Continental Oil Co. and Pure Oil Co. It will test the Winnipeg.

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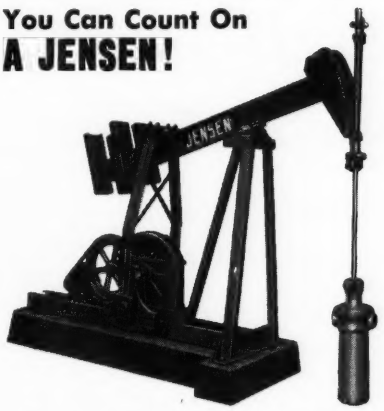

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Wyoming

General Petroleum Corp., which has unitized over 45,000 acres in Sweetwater County, known as the Buckhorn Unit, will drill within six months. The unit is 19 miles southeast of the La Barge field.

In Carbon County, Carter Oil Co. recovered gas production at the rate of over 874,000 cubic feet per day, through three-quarter inch choke, at the No. 1 Savery Unit, c se ne 17-13n-89w. Production is from the Mesaverde.

Ohio Oil Co. has drilled a successful extension to the Forest Oil No. 1 Mill Iron Land and Cattle in Hot Springs County. The new well is the No. 2 Smith, nw sw nw 9-46n-99w, and rated production is 175 barrels per day from the Embar, topped at 6519 feet. The discovery also produced from the Embar, with production at 200 barrels per day.

Roden & McRea have staked location for a 5000 foot Tensleep test in Natrona County, the No. 1 Crusader-Govt., nw nw lot 17, 19-30n-80w. It is five miles north and east

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of the Spindletop field, and is only four miles from production in the Bolton Creek field.

L. J. Peterson, who drilled a Tensleep discovery in the Manderson area of Big Horn County, has completed an extension for production in the Phosphoria after finding oil and water in the Tensleep. The new well is the No. 1 Fox-Govt., c se se 2-49n-92w. In a three-hour test it flowed 130 barrels of oil.

Also in the Manderson area, Ajax Oil and Utah Southern abandoned the No. 1 Govt.-Crusader, c ne nw 13-49n-92w, after drilling into the Tensleep at 7265 feet total depth.

Colorado

Locations were staked for 32 new wells, including 19 wildcats, in the Colorado portion of the Denver-Julesburg Basin in one week recently. The wildcats will be drilled mainly in Morgan and Weld Counties.

McDermott and Barnhart found J sand production from the No. 1 Armstrong, c sw ne 34-9n-53w, in Logan County. The test was at the interval 4890-97 feet, but the rate of production was not estimated.

Ginther-Warren-Ginther recovered gas and heavily distillate cut mud from the No. 1 Leasure, se se sw 17-2s-59w, in Adams County. Gas production was rated at 2,530,000 cubic feet per day. At last report the operator was coring below 6290 feet.

Roden and McRae Drilling Co. recovered 6,000,000 cubic feet of gas at the No. 1 Glenn, sw sw se 4-1n-57w, in Morgan County. Some distillate also was found. The well is in the Adena area, where two dry holes recently were drilled. The failures were British-American Oil Producing's No. D-1 Colo., se se nw 35-1n-58w, and Lion Oil's No. 2 Doll, ne sw ne 35-1n-58w. The No. 2 Doll was drilled as an offset to a heavily producing well.

Nebraska

Derby Oil Co. recovered gas production at the rate of 880,000 cubic feet per day from the J sand at the No. 1 Wilson, se se ne 13-12n-52w, in Cheyenne County. Twenty feet of oil also was recovered in the same test, at the interval 5174-86 feet.

Shell Oil Co. was swabbing at the No. 1 Schmid, sw se 1-16n-5[illegible]w, in Kimball County, an apparent discovery.

Utah

Carter Oil Co. was drilling ahead below 7155 feet at the No. 1 Paulson, w½ nw se 31-3s-4w, in the East Duchesne area of Duchesne County. Operator has found several shows in this well and recovered 405 feet of heavily oil and gas cut mud in a three hour test of the interval 6840-6922 feet.

New Mexico

Superior Oil topped the Tocito at 6493 feet at its Largo Canyon test, 7-25n-6w, in Rio Arriba County. Operator was last reported drilling below 6930 feet.

Continental Oil Co. was drilling below 2090 feet at its wildcat in 28-17n-18e in San Miguel County.

Western Canada

Pembina Pipe Line Co. has been granted conditional permission to lay a pipeline from the Pembina field to Edmonton. Final approval is subject to acceptance of detailed plans by the Alberta government and construction is expected to begin after June 1.

Pembina Pipe Line is a subsidiary of Mannix Ltd., a construction company with headquarters in Calgary. The projected line would connect with Interprovincial and Trans Mountain lines at Edmonton.

Moves for a pipeline outlet from the Sturgeon Lake field are under consideration by the Alberta Petroleum and Natural Gas Conservation Board. The board recently heard applications filed by Sturgeon Pipe Lines Ltd. and Consolidated Gathering Systems Ltd. Canadian Decalta Gas and Oils announced its intention to submit an application. It is proposed to construct a line to tie in with the Trans Mountain oil line to Vancouver, B.C.

An extensive drilling program is being carried out in western Saskatchewan by Husky Oil and Refining Ltd. and Phillips Petroleum. The two operators will drill 20 wildcats and extensions and some field wells in the Kindersley area. The companies already have drilled three wells, the Glidden No. 1, which

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...AND THE STATE OF THE NATION

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All of this will help to create new jobs and new opportunities in the years ahead.

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found gas in the Viking sand, the Marengo No. 1, which found gas in the Viking and oil in the Detrital, and the Marengo No. 2, a dual gas producer from the Viking and Banff sands. The Glidden No. 2 was nearing completion at last report and the Marengo No. 3 was rigging up.

Canadian Gulf was preparing to drill a stepout from its discovery, Quinn No. 9, in the Frobisher area of Saskatchewan. The operator will drill the Moffat No. 11, 1sd 11-35-3-4w2, which is half a mile east of the discovery. The same operator is drilling a wildcat approximately 20 miles southeast of these wells, the Canadian Gulf Bishop No. 12.

Nuco Petroleums and associates will drill 20 wells in the Marshall area of Saskatchewan. Others engaged with Nuco in the project are Porosity Petroleums Ltd., New Devon Petroleums Ltd., Do-Mor Petroleums Ltd., and Fair Oil and Gas Ltd.

Shell Oil Co. encountered gas production at the rate of 16,000,000 cubic feet per day at the Jumping Pound Unit No. 13, which is 25 miles west of Calgary. Gas was recovered from the Mississippian and total depth was 8883 feet.

Texas Co. Announces Big Expansion Plans

W. J. Ryan, Superintendent of The Texas Company's Los Angeles Works at Wilmington, announced that a construction program is under way which includes the building of a platforming unit, an isomerization unit, a hydrotreater, and the expansion of other facilities at Texaco's refinery here.

The platforming unit, which will use platinum as a catalyst to convert lower octane gasolines into higher quality gasolines, will have a rated charge capacity of 10,000 barrels of straight run gasoline per operating day.

The term "platforming" is a combination of platinum and reforming. The unit is so named because it actually describes a reforming unit that uses platinum as the catalyst.

C. F. Braun & Co. of Alhambra, California, have been awarded the contract for construction of the platforming unit.

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The isomerization unit is designed to produce 1,000 barrels of isobutane per operating day.

The hydrotreater has a design capacity to treat 10,000 barrels of cracked naphthas per operating day.

Other expansion plans at Texaco's Los Angeles Works call for construction of additional steam generating equipment, new tankage, and additional water cooling facilities. Scheduled date of completion of the construction program is early Summer, 1955.

Mr. Ryan's announcement coincided with a statement issued in New York by M. Halpern, Vice President in charge of Texaco's Refining Department, who said, "As part of a record capital expenditure program during 1954, The Texas Company plans construction of six platforming units with a rated charge capacity of 75,000 barrels per operating day."

Mr. Halpern also disclosed that the Company plans construction of three new alkylation units, a hydrotreater, and an isomerization unit.

"These installations will constitute a substantial part of the more than $275,000,000 scheduled for additions to properties, plant, and equipment during the current year, and will permit us to meet increased demands for high quality products," he added.

In addition to Los Angeles, Texaco is adding platforming units at Westville, N. J.; Port Arthur, Texas; Lockport and Lawrenceville, Ill.; and Tulsa, Oklahoma. Alkylation units are to be erected at Westville, N. J.; and at Lockport and Lawrenceville, Illinois.

The above plans are all in addition to the complete modernization and expansion programs being carried out at Texaco's El Paso and Amarillo, Texas, refineries, which are scheduled for completion by early Fall of this year.

Little Girl—"Daddy, why do editors refer to themselves as 'we'?"

Dad—"So that the fellow who doesn't like what he's printed will think there are too many for him to beat up."

Jorgensen Steel Acquires Los Angeles Operation of Gilmore Steel & Supply Co.

The Earle M. Jorgensen Co. has purchased the Los Angeles processing facilities and inventory of the Gilmore Steel & Supply Co., Inc.

In a joint announcement by Earle M. Jorgensen and William G. Gilmore, respective presidents of the two firms, it was divulged that the Jorgensen company will assume operation of Gilmore's Los Angeles plant on May 1.

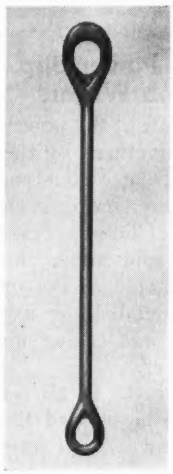
Facilities involved in the transaction include equipment for slitting, leveling, edging and shearing flat rolled steel and aluminum products. These operations are performed on material from stock or customer-furnished material. The new acquisition will augment Jorgensen's steel and aluminum distribution business, which was founded in Los Angeles 30 years ago. Other Jorgensen plants are located at Oakland, Houston, Dallas and Tulsa.

Gilmore will continue activities in the northwest, with steel and aluminum distribution plants in Portland, Oakland and San Francisco. The latter city is where the Gilmore company was founded in 1926 and is the location of its principal offices. Gilmore also operates Oregon Steel Mills in Portland.

Operations will be continued by Jorgensen at the present location of the Gilmore plant, 4820 Santa Fe Avenue, Los Angeles, until this fall. Then, the entire facilities will be moved to the location of the main Jorgensen plant at Century Blvd. and Alameda Street, where a building to house the new activity will be erected.

It is stated by Jorgensen that the newly acquired operation will be continued in much the same manner as in the past, with no significant changes in personnel or methods.

"Small-Upper-Eye" Elevator Links Now Offered by Web Wilson



In addition to supplying the only true "Drop Forged" Elevator Links, Web Wilson Oil Tools, Inc. now has available links with the "small" upper eye preferred by many operators.

Not only are these links forged from a single billet of high quality alloy steel, with absolutely no welding, but a vertical furnace and quench tank are used for heat treatment to reduce the hazards of bending or warping.

The junctures of the top and bottom eyes with the shank have been scientifically developed to keep unit stresses within safe limits, and adequate steel in the top of the upper eye avoids bending under load. Web Wilson "Forged" Elevator Links do not "breathe" when heavy loads are taken.

These new links are available in sizes from 1¾" to 2¾" with lengths from 36" to 132". The massive 2¾" x 132" links are especially designed for the heaviest loads encountered in the deepest wells. Address the manufacturer at Box 72096, Los Angeles 2, California, for complete details.

New Catalog Issued by McEvoy

McEvoy Company of Houston, manufacturer of oil field equipment, is very pleased to announce the completion of a most comprehensive new catalog which is now available for distribution to the trade. The McEvoy Company has introduced a new line of improved Casing Hangers and Well Heads, Type "S". These are fully described in this catalog. Every effort was made in making this catalog to provide a helpful tool for those who are interested in McEvoy types of products.

The new McEvoy Catalog No. 54 contains an up-to-date listing of all McEvoy Products, including the Automatic Self-Sealing Conduit Gate Valves, Gas Lifts, Well Head Equipment, and other miscellaneous items. Technical data, list prices, photographs and schematic illustrations are included in the catalog.

Also available for immediate distribution is McEvoy's Bulletin No. 101 for those who are interested only in McEvoy Valves, their characteristics, prices, and features.

Either, or both, of the above catalogs will be sent free of charge upon writing the McEvoy Company, P.O. Box 3127, Houston, Texas, or by contacting any of their field men, representatives or agents.

B.S.&B. Publish New Catalogs

Black, Sivalls & Bryson, Inc., manufacturers of oilfield processing and storage equipment, announce the publication of new catalogs on Indirect Heaters and High Pressure Horizontal Separators.

The 16-page BS&B Indirect Heater Catalog 32-02 gives complete information on the new model Series 70 Indirect Heater, including capacities, dimensions flow coil sizes, and standard equipment on a newly expanded line. It describes and illustrates uses and features; solves both gas heating and oil heating problems. Each problem is solved step by step with full use of graphs and charts.

The 8-page BS&B High Pressure Horizontal Separator Catalog 30-10 describes the complete line of Model HLC Separators, points out factors

to be considered when selecting a separator, and tells how the Model HLC Separator works, using a double page cutaway drawing as an illustration. The catalog lists capacities, specifications, and dimensions of the 27 available sizes, and describes the new BS&B "Climax" Liquid Level Controller Pilot, Type 1450, which is now included as standard equipment.

Both catalogs are fully illustrated and written in non-technical language for easy use. Available upon request from Black, Sivalls & Bryson, Inc., 7500 East Twelfth Street,, Kansas City 26, Missouri.

Lane-Wells Opens New Branches

To provide additional facilities for oil field customers, Lane-Wells Company has opened three new branches bringing the total to 95 in the United States, Venezuela and Canada, Rodney S. Durkee, president announced.

New truck stations were opened at Pleasanton and Seminole, Tex.

R. H. Ault, formerly gun perforator operator No. 1 at Corpus Christi, is operator in charge of the new Pleasanton base on Floresville Highway, telephone Pleasanton 2419. R. E. Parmley, formerly station superintendent at Hobbs, New Mexico, is now station superintendent of the new Seminole base on East Highway 180. The Gulf Coast Division Sales Department has been moved to a downtown location in the Bankers Mortgage Building, Houston.

Security Engineering Expands Offices, Warehouse Facilities In Rocky Mountain, Oklahoma

Marking a progressive step in their long range programs to provide even better service to the nation's oilfields, Security Engineering Division, Dresser Operations. Inc., have announced the expansion of sales and service facilities in their Rocky Mountain Division and Duncan, Oklahoma District Offices.

In the Rocky Mountain Area, Security has acquired a newly constructed building in Casper, Wyo. The new structure will house the division personnel as well as providing increased warehouse facilities. Roland O. Crawford is Security's Rocky Mountain division manager, while Bud Penniston, Rex Durham, R. S. Johnson and Joe Abrams handle sales and service.

A similar move to a new building by the Duncan Oklahoma office of Security has also been made. Warehouse facilities have been greatly increased to provide faster service to rigs operating in the area. The Duncan office is under the supervision of District Manager Floyd Huston, while Gene Martin and Gilbert Charleston are the Security Sales Engineers for this area.

"Deco" Balanced Power Slip Purchased by Web Wilson

Manufacture and sale of the power slip previously manufactured by the DeLaney Company, of Houston, Texas, have been taken over by Web Wilson Oil Tools, Inc. This successful product will be sold under the name "Web Wilson Balanced Power Slip" and is recommended for use on tubing, drill pipe and casing up to 7 inches in diameter.

Field warehouse stocks of all replacement parts will be carried for the many present owners of this power slip, and parts to be manufactured by Web Wilson Oil Tools, Inc. will be interchangeable with parts now in use.

The Web Wilson Balanced Power Slip is outstanding because of its small number of parts, making up an assembly with simplicity, ruggedness and dependability approved by many drilling contractors and operators who now have these slips in daily use. Air pressure commonly available on drilling rigs is suitable for operation, and as only a small volume of air is required, no increase in compressor capacity is needed. Exclusive Web Wilson Slip Buttons ensure safe, positive gripping, and economical operation.

When not in service, the assembly can be lifted on the cat-line and set on a special stand (furnished with the slips) anywhere on the derrick floor; or the slips can be swung out of the way in the conventional manner. Installation, operation and servicing are extremely simple.

Any Web Wilson sales agent, or the manufacturer at Box 72096, Los Angeles 2, California, will gladly furnish complete details, specifications and prices.

D+B to Manufacture, Sell and Service Otis Two-Zone Pumps

Otis Pressure Control, Inc., and the D+B Division of Emsco Manufacturing Company, have concluded an exclusive agreement by which D+B is authorized to manufacture, sell and service the Otis Two-Zone Pump. Announcement of the agreement is made by W. C. Kinder, Emsco's Vice President and General Manager of Sales.

All engineering and manufacturing operations will be performed at the D+B plant in Garland, Texas. Installation, service and repair of the pump will be performed by trained D+B service men. This includes pumps in service and those to be installed.

Mr. Kinder pointed out that Otis Pressure Control has used D+B sub-surface pumps, exclusively, in Two-Zone pump installations. Through this close association D+B personnel has acquired valuable knowledge and experience in the manufacture, service and repair of the Otis Two-Zone Pumps. Mr. Kinder stated, D+B representatives are in a position to assist operators in selecting the proper equipment for dual-completion installations, including pumping units, sucker rod strings, Two-Zone Pumps and miscellaneous equqipment.

New Catalog Available for Franks Line

Franks Manufacturing Corporation of Tulsa announces its new 1954 52-page catalog which contains Franks complete line of well servicing and workover units for the shallowest to deepest wells, and a new line of drilling rigs for drilling to 7,500 feet.

Shell has pulled out at 6013 feet from its R & R No. 36X-11 wildcat endeavor on Section 11-10s-13e, west of Chowchilla, Merced County. Hilmar Community Oil & Gas Company's Fausone No. 1 test on Section 25-6s-10e is reported digging ahead near 1000 feet.

OIL PROPERTY WANTED

Wish to contact party with oil property or prospect that merits development. Have 3000 ft. rotary equipment and know how. Barry Well Drlg., Fallon, Nevada. 4/30d

Drilling Boom at Deer Creek

An energetic drilling boom is taking shape at Deer Creek in Tulare County, 45 miles north of Bakersfield on the Porterville Highway, as the result of completion of a wildcat drilled by Homer F. West, on the Hallaian lease.

According to announced plans, West, who is acting as operator for his own interest and that of Sid Wyman, part owner of the Sands Hotel and Casino in Las Vegas, will keep at least one rig, possibly two, busy with a one-well-to-five acres development program on the 40-acre Hallaian lease.

Also under lease to the same operator are parcels owned by National Development Corporation, Zola B. Moore, Clarence Gibson, Emmett Harris and E. A. Dunham, totaling 147 acres between the new well and Highway 65. Charles E. Strange handled most of the leasing in the area.

Current excitement on the Hallaian lease was touched off by completion of West's Hallaian No. 1 on Sec. 22, 22-27, for 118 barrels a day net of 17-gravity oil. One week after completion, the shallow well was still netting an average of 60 barrels a day. Crude oil being produced by the well is of high lube content, with some gas present, possibly enough to power the pump engines. Oil is being sold to Palomar Oil & Refining Corporation, a Bakersfield concern.

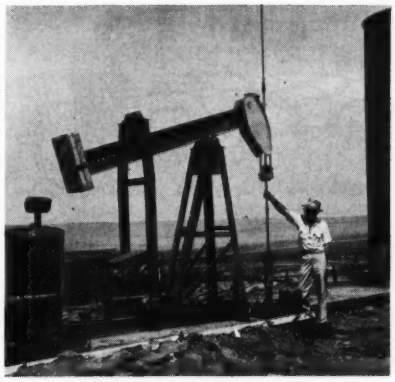
Site of the Hallaian lease is about one-half mile northwest of McGreevy-Neary Oil Company's No. 1 well, which was completed last December for an initial production of 60 barrels a day net of 17-gravity oil from 735-914 feet.

Total depth of Homer West's new producer, which was drilled by B&B Drilling Company, is only 950 feet. The well was plugged to 822 feet for completion from a marine-type sand which some observers believe to be equivalent to the Chanac sand.

Following completion of his first well, West moved one location east to drill Hallaian No. 2, which found the same shallow pay, and then to the north for a northerly offset, Hallaian No. 3.

Roy Rhoads handled the drilling chores on both wells.

Rhoads, incidentally, is a water well driller from Porterville who uncovered oil shows in the Deer Creek area with a water well which he was drilling about a year and a half ago. Those shows were credited with leading to the present exploration in the area.



Homer F. West with Hallaian No. 1, which netted 118 barrels a day from 822 feet.

Flintridge Oil Company, of which Homer West is president, holds the 369-acre Margaret St. Clair property immediately west of the Hallaian lease and spudded in without delay to drill an offset to the first West well. Owens Drilling Company handled the initial drilling work for Flintridge with a cable tool rig.

Douglas Drilling Company of Bakersfield moved in on Sec. 27, 22-27, near Sunland Oil Company's cannery at Terra Bella to drill a southerly extension test.

Additional drilling is planned for the area by other small operators desirous of wildcatting in a play where shallow depths tell the story and the answer is not long in coming after each new well is spudded in.

Standard To Construct New Multi-Million Dollar Plant

Plans for immediate construction of a multi-million dollar plant designed for the first commercial production of the chemical intermediate "isophthalic" were announced recently by Standard Oil Company of California.

The new plant is to be built at Standard's Richmond (Calif.) Refinery. Completion, on a site now being prepared, is scheduled for mid-year of 1955.

Production from this new chemical facility, designed to turn out 50,000,000 pounds of isophthalic a year, will be marketed by Oronite Chemical Company, a Standard Oil Company of California subsidiary.

Isophthalic, which so far has been made only in experimental amounts, represents an outstanding new raw material for the plastics industry, and for the manufacture of surface coatings. It can be used to make protective enamels and paints better than those now used on automobile bodies and household appliances, and as the binder in the manufacture of such things as glass fishing rods, molded auto bodies and lightweight glass fibre boats.

The new chemical intermediate will be made by a process invented and developed after eight years of research by California Research Corporation, another Standard subsidiary. In the process, isophthalic of exceptionally high purity is derived from metaxylene, a raw material produced by catalytic reforming operations in Standard's Richmond Refinery.

Although the principal market for isophthalic is in the East, Standard elected to build its plant at Richmond because of the advantages derived from integration with its existing refining and petrochemical facilities. To serve the chemical markets, Oronite has arranged for shipment of a major portion of the new plant's output by water to New Jersey, where it is establishing a large storage and distribution terminal.

Data developed by California Research Corporation, and confirmed by the laboratories of several of the largest alkyd resin manufacturers, show that isophthalic is a superior raw material for the manufacture of oil-modified alkyd resins. The higher molecular weight resins attainable with isophthalic enable manufacturers to produce many types of superior alkyd vehicles at a lower cost than is possible using phthalic anhydride.

Pilot plant quantities are currently available from Oronite for evaluation by potential users of this new chemical.

R. M. Walters, F. L. Shepherd and Paul E. Gregg Sr., head the Rusty Walters Drilling Company, recently organized in Bakersfield to enter the contract drilling industry.

THIS LAUGH

OFF!!

A fond mother asked her four-year-old son what the nursery school had taught the pupils that day. Replied the youngster, "They taught the kids who hit, not to hit; and the ones who don't hit, to hit back."

Mrs. Smith: "Why is it I never hear you talk about the days of low prices any more?"

Mrs. Brown: "Oh, I can't afford to; it dates me."

Manager:" Have you any letters of reference?"

Salesman: "Sure; read this."

Manager: "To whom it may concern: Bill Johnson worked for us one week, and we are satisfied."

Wife to husband: "I didn't say there weren't two sides to every story—I just said I wasn't listening to your side."

A visiting Texan was telling his Minnesota host about the big fish he had caught in the Lone Star state.

"As a matter of fact," said the Texan, "I caught one that was eight inches."

Our Minnesota friend told the Texan that a fish that size was small in his state.

"Maybe so," said Tex, "but down there we measure a fish between the eyes."

Jo: "Jack keeps saying that music and laughter have departed from his life. What happened?"

Blo: "The finance company repossessed his TV set."

On a questionnaire asking: "What is the principal contribution of the automobile age?" the following answer was given by a college student: "It has practically stopped horse stealing."

Husband to friend: "My wife is two hours late. She's either had an accident with the car, been kidnapped, or she's shopping. Man, I hope she ain't shoppin!"

She's the kind of a girl you don't whistle at. You can't . . . your tongue is hanging out.

Speaking of horse sense, wasn't it the horse that used to be afraid of the automobile at the time that pedestrians were laughing at it?

Releasing type fishing tools such as spears, sockets and overshots require downward blows for release of slips or grapples . . . and the handiest tool you can use to obtain downward blows when fishing with equipment of this type is the BOWEN Bumper Sub.

It is amply strong to stand the abuse of drilling and fishing under all conditions, and requires only occasional servicing.

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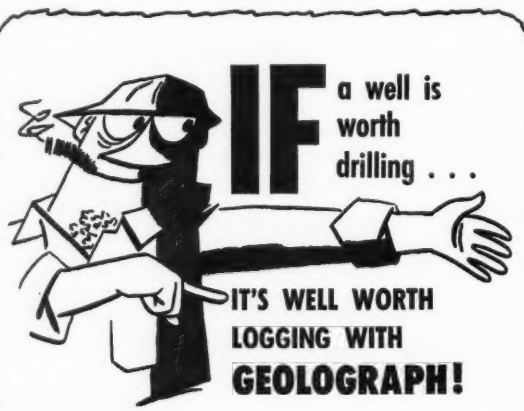

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